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Excess Cash and Agency Costs: Some International Evidence

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ABSTRACT

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Objectives

The main objective of this thesis is to study possible links between excess cash and agency costs. The theoretical part presents different types of agency problems and their relation to excess cash. The empirical part first identifies excess cash holding firms and studies the persistence of excess cash holdings. Secondly it examines how excess cash affects sales growth, operating performance, diversification, asset utilization and the use of trade credit.

Data

The accounting data needed in this thesis is acquired from Datastream and additional data items are from Worldscope Global Researcher database. The sample includes 1096 firms (5480 firm-years) during the period of 1996-2000. These firms are from 15 countries worldwide and represent 18 industry groupings.

Methodology

The sample firms' cash holdings are studied by using a modification of Opler's (1999) regression equation. Firms are ranked into different quartiles of excess cash depending on how their actual cash-to-assets ratios differ from the ones suggested by the regression model. Categorical analyses are applied to study how firms with different amounts of excess cash differ from each other in hypothesised perspectives.

Empirical results

The empirical results indicate support to the main hypothesis that excess cash is related to agency costs. Substantial excess cash holding firms have significantly lower asset utilization rate than other firms. Furthermore firms that loose all of their substantial excess cash holdings increase capital expenditure, suggesting inefficient use of assets. Finally firms that have substantial excess cash have lower operating performance than the rest of the sample firms.

The results do not show that excess cash holding firms are more diversified or that they offer more credit to their customers. Furthermore expected agency costs in sample countries do not explain the excess cash holdings.

Key Words

Excess cash, agency costs, operating performance, asset utilization

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Tutkimuksen tavoitteet

Tutkielman päätavoite on tutkia ylimääräisen likviditeetin suhdetta mahdollisiin agenttikustannuksiin. Tutkielman teoreettinen osa esittelee erityyppiset agentuuriongelmat ja ylimääräisen likviditeetin vaikutuksen näihin ongelmiin. Tutkielman empiirisessä osassa selvitän ensiksi ylilikvidit yritykset ja tutkin ylimääräisen likviditeetin kestoa. Toiseksi tutkin ylimääräisen likviditeetin vaikutusta myynnin kasvuun, kannattavuuteen, monialaistumiseen, pääoman kiertonopeuteen ja kauppaluoton käyttöön.

Lähdeaineisto

Tutkielmassa tarvittava tilinpäätösaineisto on kerätty Datastream -tietokannasta lisäksi täydentäviä tietoja on kerätty Worldscope Global Reseacher -tietokannasta. Aineisto sisältää 1096 yritystä (5480 yritysvuotta) vuosilta 1996-2000. Nämä yritykset ovat 15 maasta ja edustavat 18 toimialaa.

Aineiston käsittely

Yritysten likviditeettiä tutkitaan käyttämällä modifioitua Oplerin (1999) regressioyhtälöä. Yritykset jaetaan luokkiin sen mukaan kuinka niiden todellinen likvidien varojen suhde taseen loppusummaan eroaa regressioyhtälön perusteella saatavasta arvosta. Tutkin ylimääräisen likviditeetin vaikutusta hypoteeseihin vertaamalla eri likviditeetin omaavia yrityksiä toisiinsa.

Tulokset

Empiiriset tulokset tukevat keskeistä hypoteesia agenttikustannusten ja ylimääräisen likviditeetin riippuvuudesta. Yritykset joilla on huomattavasti ylimääräistä likviditeettiä kärsivät muita yrityksiä alhaisemmasta pääoman kiertonopeudesta. Lisäksi yritykset, jotka häviävät kokonaan huomattavan suuren ylimääräisen likviditeetin lisäävät pääomankäyttöä, mikä vihjaa kannattamattomiin investointeihin. Lopuksi paljon ylimääräistä likviditeettiä omaavat yritykset ovat muita kannattamattomampia.

Tulosten valossa ylimääräinen likviditeetti ei vaikuta monialaistumiseen tai lisää myönnettyä kauppaluotoa. Lisäksi odotetut maakohtaiset agenttikustannukset eivät selitä ylilikvidien yritysten määrää tutkimusmaissa.

Avainsanat

Ylimääräinen likviditeetti, agenttikustannukset, kannattavuuden kehittyminen, pääoman kiertonopeus

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1. Introduction

1.1. Background

The purpose of a firm is to use the resources allocated to it by shareholders in generating profits. When a firm succeeds in its operations and generates positive cash flow the firm faces a difficult question of what to do with these cash flows. In order to maximize efficiency firm should return all capital that cannot be used profitably within the firm to shareholders in terms of dividends or share repurchases. However it is not easy to decide what is the optimal amount that should be returned to shareholders. What makes this decision increasingly difficult is that firms need capital to finance their daily operations and the need for capital fluctuates continuously with business cycles and strategies. Also the firm's ability to raise additional capital externally can deteriorate unexpectedly because for example decreased supply of capital. Therefore the firm should retain adequate levels of cash to be able to finance its operations in a volatile environment.

However if the firm retains too much cash managers can be tempted to use this cash for projects that may have negative net present value but are otherwise beneficial to managers. This behaviour is based on the free cash flow hypothesis (Jensen, 1986). In the payout policy the interests of shareholders and managers seem to conflict, which leads to the agency theory that studies the conflicting interests between shareholders and managers. Brealey and Myers (1996, 991) claim that the agency theory is one of the seven most important ideas in finance. They argue that it can be used to explain managerial and financial markets behaviour in many financial decisions including lending arrangements and leverage buyouts.

It seems that liquidity in terms of cash holdings is valuable to the firm, to the managers and as well to the shareholders. The total value of liquidity is different to all these stakeholders and probably therefore it is defined among the ten unanswered question in modern finance by Brealey and Myers (1996, 996).

The importance of cash holdings has been studied for decades. The earliest studies date back to the sixties. For example Miller and Orr (1968) provide a model that estimates the demand for cash. In the seventies and eighties the importance of cash received increased attention as the conflicting interests of managers and shareholders were presented (e.g. Jensen and

Meckling (1976) and Fama (1980)). Later on the basis of agency costs Easterbrook (1984) finds a connection between liquidity and monitoring, Jensen (1986) finds a relation between free cash flow and acquisitions and Dann and DeAngelo (1988) find a relation between liquidity and the market for corporate control. The more recent studies have concentrated in developing more accurate models for controlling the need for cash and studying how cash levels affect firm's operations and valuations (e.g. Opler et al. (1999) and Harford (1999)). The latest focus on studies concerning the value of liquidity has been its effect on cash disbursement decisions (e.g. Jagannathan et al. (2000) and Lie (2000)).

The main research problem of this thesis is to study possible links between excess cash and agency costs. This thesis contributes to the existing literature by presenting international evidence on the existence of excess cash and by expanding the scope of the effects of excess cash on asset utilization, sales growth and the use of trade credit. The main results show that excess cash is related to agency costs. Firms with excess cash holdings have lower asset utilization rate and generally suffer from lower operating performance than other firms.

1.2. Motivation and objectives of the study

The motivation of this study is to find further evidence from the value of liquidity by expanding the study of Opler et al. (1999) to international level and by studying the relation between sales growth, asset utilization, trade financing and cash holdings. The main objective of this study is to define some actions and performance measures that can be caused by conflicting interests between managers and shareholders and to study if the firms that have more cash than needed resort more often to these actions or show poorer performance in these measures than firms that do suffer from excess cash. This objective is sought:

- First by developing a model for average cash reserves controlling for firm specific differences and by identifying firms that have different cash reserves than suggested by the model.
- Second by studying how persistent these differences are and what causes fluctuations in cash reserves.
- Third by studying how cash reserves affect sales growth and operating performance.
- Fourth by studying the relation between cash reserves and diversification.

- Fifth by studying how cash reserves affect agency costs in terms of asset utilization.
- Sixth by studying how cash reserves affect the use of trade credit.

1.3. Limitations of the study

Although the objective of this study is to find behaviour that is shareholder value decreasing the actual effects of this behaviour on share price is not studied. This is due to that cash holdings build-up gradually and therefore it cannot be defined when the share price effect should take place. The share price effects of many decisions concerning capital expenditure and payout increases are also already widely studied and these results can be used in this thesis.

The data presents some limitations as well. My sample period and geographical scope are significantly reduced from target due to limited availability of accounting data. Actually the measure for suggested cash holdings requires so many accounting items that the limited availability is not surprising and due to the difficulties in further processing the data a larger sample would have required unfeasible amount of work.

1.4. Structure of the study

The remaining of this study is organized as follows. Chapter 2 provides a definition for excess cash and identifies its causes. In addition two capital structure theories that provide explanation for cash levels and agency related theories are presented. Chapter 3 provides a link between the agency problems and the problems that are caused by excess cash. It also presents previous empirical evidence from direct and opportunity costs related to excess cash holdings. Chapter 4 presents corporate governance mechanisms and empirical evidence how these affect excess cash holdings. Chapter 5 presents my hypotheses and their theoretical backgrounds. Chapter 6 presents a detailed description and characteristics of the data and an overview of research methodology. Chapter 7 presents empirical findings and discussion of these results. Chapter 8 presents conclusion and suggestions for future research.

2. Causes and motives for excess cash holdings

2.1. Reasons why firms become excess cash holders

By definition excess cash is accumulated free cash flow that exceeds firm's positive net present value investment opportunities and is not returned back to shareholders (Harford, 1999). Namely it is funds, which do not have any profitable use within the firm. On the contrary if these funds will be used they can be used only to value decreasing projects. Alternatively these funds can be invested in short-term instruments so that they can be used in the near future when the management finds tempting investment opportunities.

A firm can become an excess cash holder for two main reasons. It can either experience positive operating cash flows or positive non-operating cash flows. Positive cash flows alone are not enough to make a firm an excess cash holder, it must also retain a part of these cash flows instead of distributing them back to shareholders. The retained portion must be larger than is needed to retain optimal investment policy. There are many factors that determine how much a firm should retain without becoming an excess cash holder but its investment opportunities play a key role in this decision. Many studies (e.g. Lang et al.,1995) suggest that there is a negative relation between investment opportunities and the amount of excess cash a firm holds. Outsiders can approximate firm's investment opportunities by either using market-to-book ratio or Tobin's q. Also the nature of cash flows affects the build up of excess cash. By nature it is meant that cash flows can be either recurring or nonrecurring. Opler et al. (1999) find that the main reason for excess cash is a positive change in operating cash flows and a significantly smaller positive change in payout to shareholders. They also find that large portions of these operating cash flows are recurring.

Also nonrecurring cash flows can cause excess cash, examples of these kind of cash flows are asset sales, sudden cash windfalls and cash flows from financial operations. Lang et al. (1995) find that firms, which sell assets, are usually poor performers, while positive operating cash flows are related to abnormally good performance (Opler et al., 1999). Another source of non-operating cash flows is a sudden cash windfall. This can be for example damages from a successful lawsuit. Blanchard et al. (1994) find that most of the firms that receive unexpected cash windfalls do not return them to shareholders and by doing so they allow possible excess

cash build-up. Tufano (1998) argues that cash flow hedging strategies can also lead to a situation where the firm holds excess cash.

2.2. Theories on cash holdings

There are two main theories that may explain corporate cash holdings: 1.The transaction cost theory 2. The financing hierarchy theory. These theories actually explain more than the cash holdings, they explain the whole capital structure, which is a different issue than cash holdings. However because cash holdings are a part of the capital structure it cannot be explained without taking other parts of the capital structure into consideration.

1. The transaction cost theory

The transaction cost theory is based on Keynes' idea that converting cash substitutes into cash includes a cost. An attempt to avoid this cost gives a motive for holding cash. According to this theory when a firm enters capital markets to raise new financing it will always face a fixed and a variable cost and the variable cost depends on the amount raised. A firm that needs liquid assets can use one or a combination of following alternatives: Raise new funds in capital markets, liquidate existing assets, reduce dividends and capital expenditure or renegotiate existing financial terms. All these ways of raising funds include always a cost even if the firm only converts the form of its own assets. And because there is a fixed cost of entering capital markets it is beneficial for the firm to raise funds infrequently and hold cash as a buffer. This leads to an interesting finding regarding the role of cash. By definition cash is only negative debt but when raising new debt includes a cost, cash is not negative debt anymore. Therefore for any amount of net debt there should be an optimal amount of cash. This is because a firm faces a cost if it is short of liquid assets and if it holds liquid assets. The cost of being short of liquid assets includes cut backs in dividends and investments and the cost of raising new funds. "The cost of holding liquid assets is their lower financial expected return, because part of the benefit from holding liquid assets is that they can be more easily converted into cash". With these assumptions it is expected that the amount of liquid assets is positively related to the volatility of cash flow divided by total assets and to the length of the cash conversion cycle. And negatively related to the interest rates, to the cost of raising debt, to the ease of selling assets, to the cost of hedging risk and to the size of firm's dividend. (Opler et al.,1999)

2. The financing hierarchy theory

According to the financing hierarchy theory a firm uses always the mean of financing that is the cheapest. The differences in the cost of financing are determined by information asymmetries and risks between the borrower and the lender. (Shyam-Sunder and Myers, 1999)

Under this theory there is no optimal amount of cash or optimal amount of net debt. The lack of optimal cash level is due to the fact that a firm can raise new debt whenever it needs it with a low cost and the holding of cash does not include a cost either. Therefore the role of cash would be just negative debt and there might be only an optimal amount of net debt, which could be achieved either by holding low amounts of debt and low amounts of cash or by holding high amounts of cash and high amounts of debt. However there is not even an optimal amount of net debt because risk makes equity financing always more expensive than debt financing. Therefore firms issue debt when they need to finance capital expenditure that is beyond their retained earnings. And when the firms have cash flows that exceed capital expenditure they can pay back debt and let cash to accumulate. This policy of allowing cash to accumulate is optimal because holding cash does not include a cost. In this model the level of cash depends on firms in and out cash flows. (Opler et al.,1999)

2.2.1. Empirical evidence from these theories

These theories of capital structure have raised great interest and they have been studied intensively. In one of the most recent studies Shyam-Sunder and Myers (1999) find support to the financing hierarchy theory. According to them it explains very well the corporate finance behaviour of mature firms. They also find support to the transaction costs theory. However their simulation results show that transaction theory is not rejected even if it gives false results and that financing hierarchy theory is easily rejected when the results are false. Therefore they argue that the financing hierarchy theory has more explanatory power.

The use of these theories for explaining cash balances is scarce. Opler et al. (1999) find support to both models in terms that cash levels seem to be mean reverting and firms seem to have target cash ratios. Generally their findings support more the transaction cost theory but

firms that do well have significantly higher cash levels than the theory would suggest. On the whole the empirical evidence from these theories is mixed.

2.3. Additional motives for cash holdings

In addition to the two previous complete theories there are single managerial motives that explain why firms hold significant cash buffers. One of these is the precautionary motive, which is very close to the transaction costs theory. Management recognises the fact that it may face a situation where it due to insufficient cash flows does not have possibilities to invest at a rate that would be strategically the most suitable. By holding cash buffer the firm can avoid this situation and keep investing at the wanted rate without having to suffer the costs of increasing debt or cutting back dividend. Therefore it may be beneficial for the firm to hold cash to mitigate costs of financial distress and underinvestment. In this case the holding of cash buffer would benefit shareholders because the shareholders bear the costs of underinvestment, financial distress and dividend cuts. However the management may have other motives for holding cash buffer, which are no longer beneficial to shareholders. Cash buffers allow managers to take projects, which are in their best interest but destroy shareholder value. This is because cash buffers allow managers to take projects, which the external markets, would not be willing to finance. This feature of cash distinguishes it from negative debt at least from manager's perspective. (Harford, 1999)

Cash buffers are beneficial for managers who want to increase their own utility even at the cost of shareholder's utility. Easterbrook (1984) argues that because monitoring is costly for shareholders and a shareholder who does monitoring does not get the full reward of it to himself reduces shareholders willingness to monitor management. However if the firm must constantly enter the markets for new capital an intermediary will investigate its managerial policies. The benefits of these investigations will be shared between current shareholders and new financiers. He argues that managers who have to raise capital frequently are more likely to act in shareholders interest. This gives birth to another motive of holding cash buffers, which could be called monitoring avoidance motive.

Tufano (1998) states that many managers identify the fact that cash buffer protects them from entering the external capital markets. He also argues that managers find entering the external capital markets unpleasant because financiers may reject further financing and this may lead to termination of management's pet projects, which were designed to maximise management's own utility possibly at the cost of shareholder wealth. He also states that cash flow hedging which was previously defined as a possible cause of excess cash is sometimes used to protect these pet projects.

3. Excess cash as an agency problem

Current way to organise business is to separate ownership and management. This separation gives birth to possible conflicts between these two groups. Managers have received authority from shareholders to make decisions on how to manage the firm. For the shareholders the firm is just an investment and they want that the managers work in their best interest and maximize the value of the firm. For the managers the firm represents much more. Although they may be shareholders as well but their well-being is also related to salary, perks, self-esteem, and recognition that they receive because of their position. The firm creates value for manager's human capital. It is in managers interest is to maximise all these benefits and not only the firm's and their shareholdings value. Therefore managers can make decisions that are beneficial for them personally but represent a cost for the shareholders. (Byrd et al., 1998)

Jensen and Meckling (1976) claim that there are conflicting interests between the agent and the principal if the principal has delegated some decision making authority to the agent and both of these parties try to maximize their utility. The latter describes well the relation between shareholders and managers. An attempt to limit the financial loss caused by these different interests has its costs as well. These costs can be divided into three categories.

Monitoring costs occur when the principal tries to control agent's behavior by setting incentives and monitoring his behavior. In addition to just monitoring his behavior the principle affects agent's behavior by contraction and setting limits to his behavior. The agents may also use resources to guarantee that they do not take actions that might harm the principal. The resources used to in this context are defined as bonding costs. The last category is the residual cost, which is the loss that the principal suffers because agent's behavior does not completely maximize principal's utility despite the attempts to control agent's behavior. The residual loss will always occur if there is even a slightest difference in the interest of the principal and the agent because perfect monitoring is practically impossible.

Byrd et al. (1998) describe four types of agency problems that arise from the different interests between managers and shareholder. I will use this framework for presenting the theoretical agency costs that may be caused or made more severe because excess cash and present empirical evidence of these costs.

Table 1: Four types of agency problems

Problem	Definition
Asset use	Managers have can have incentive to misuse corporate assets
Risk preference	Managers tend to be more risk averse because their wealth is tied to ongoing viability of the firm
Horizon	Managers tend to have shorter horizons for achieving investment results than stockholders have
Effort	Managers may have incentives to exert less effort than stockholders expect them to

Source: Byrd et al. (1998)

3.1. Asset use problem

Jensen (1986) argues that according to the free cash flow hypothesis free cash flow results into agency costs between managers and shareholders. He claims that managers have an incentive to keep excess cash (which is accumulated free cash flow) within their control because they value control and the more resources they have under their control the better. The reason for this asset size maximization can be the finding that there usually is a positive relation between firm size and managerial compensation. In shareholders interest would be to return all excess cash to them because just by definition excess cash is something that the firm cannot invest profitably on its behalf. However he argues that managers will use this excess cash to grow their firm even beyond its optimal size or waste it on organisational inefficiencies which both reduce shareholder value. They can do this because external markets cannot monitor their behaviour because the firm does not raise debt or issue shares and the monitoring by shareholders suffers from free rider problem. This represents the agency cost of asset use defined by Byrd et al. (1998).

Harford (1999) finds that firms that have excess cash act consistently with the free cash flow hypothesis. He finds a positive relation between the level of excess cash and the probability to attempt acquisitions; furthermore these acquisitions often increase diversification. Diversifying acquisition are shown to be usually value decreasing (e.g Dennis et al. (1997 a)). He finds that these acquisitions cause negative share price reaction when announced and reduce the operating performance of the combined firm in the future. He also finds that the markets expect a firm that builds excess cash to introduce value-destroying policies and

therefore if a firm does not distribute as much cash as expected by the markets back to shareholders its share price will decrease.

Opler et al. (1999) find only limited support to the claim that excess cash increases acquisitions and capital expenditure. They find that the capital spending of firms with poor investment opportunities (low market-to-book ratio) is more sensitive to excess cash levels than spending of firms with good investment opportunities (high market-to-book ratio). However the change in capital expenditure and in acquisitions is not significantly different from the change in payout. Also the change is quite small compared to the change in excess cash. They find stronger support to arguments that cash really affects spending on investments by studying firms with negative excess cash. When a firm has negative excess cash (it has less cash than it would need according to their regression model) it reduces more its spending on investment than it increases it in case of positive excess cash. Their findings support more the claim that firms that generate excess cash keep it instead of using it.

Johnson et al. (1985) provide additional support to the poor asset use of firms with excess cash. They find that in the case of sudden manager death share prices experience a positive reaction and this shock is the largest for firms that are diversified and return a small portion of earnings to shareholders. These kinds of firms are very likely to suffer from excess cash because low payout and high degree of diversification implies that management has acted previously in a way that does not maximize shareholder wealth.

Poor asset use should be visible in financial statements. For example if a firm makes poor investments its sales are likely to increase more than its profits. Brush et al. (2000) study the relation between free cash flow and sales growth. They find that sales growth influences positively performance, measured as shareholder returns. However firms that have large amounts of free cash flow experience reduced positive influences of sales growth on performance. They do not find that excess cash holding firms would use it to increase sales differently from firms that do not have free cash flow. Their main finding is that sales growth in general increases value however very high cash levels can lead to a situation where sales growth becomes value decreasing. This implies that these firms suffer from asset use problem and increase sales by investing into negative net present value projects. This finding also supports Harford's (1998) finding of poor stock price development if a firm has excess cash and this firm tries to increase sales by acquiring another firm.

Controlling the agency costs of asset use is a difficult task and attempts can have an opposite effect. Shin and Kim (2002) argue that outside shareholders use budget constraints to control agency costs of asset utilization. However this may increase the asset use problem by leading to a situation where managers use the budgeted resources even though they do not have value increasing projects. They do this because usually unused budgets cannot be carried over to next year and if one division cannot consume the funds that were budgeted to it there is a risk that in the next year less funds will be allocated to this division. The unused budgets are directly comparable to excess cash. They find that firms that have more cash holdings invest more than firms that have less cash holdings even when these firms are adjusted for investment opportunities. They also find that the difference is the largest in the fourth quarter of financial year suggesting that manager's want to use the funds assigned to them. In addition they find that diversified firms invest more but less efficiently than their focused peers and this behavior becomes even clearer in the fourth quarter. These findings suggest that if managers do not have the ability to keep excess cash they spend it.

3.2. Different risk preference

Generally shareholders and managers have different amount of opportunities to reduce the risk to what they are exposed either by managing the firm or by just by owning its shares. Shareowners can diversify their portfolio so that they are not exposed to any firm specific risk. May (1995) claims that because managers have invested in the firm both their human capital and sometimes part of their financial capital as well they have a portfolio, which is poorly diversified. By acquiring firms from different business areas managers can increase the diversification of their own portfolio and these acquisitions can well be a positive net present value investment for managers. Chen and Steiner (2000) argue that according to the agency theory diversifying acquisitions are expected because they reduce the variance of firm's cash flow and thereby reduce the risk of the company, which in part reduces the risk that managers are exposed to. Excess cash increases the probability of diversifying acquisitions (e.g. Harford (1999)) and therefore it seems that managers identify the opportunity to reduce risk and they also use this opportunity.

Excess cash that allows diversification has value also to managers with specialized knowledge. May (1995) finds that managers tend to acquire firms, which operate in technologies where they have specific expertise. However Shleifer and Vishny (1989) find that if a manager has vested many years with one firm they tend to make diversifying acquisitions. This is because their human capital becomes more firm or industry specific and has less value in labor markets. The personal gains from diversification become larger than the gains from specialization.

Diversification enhances also the internal capital markets, which allow managers to allocate assets to different business units that suit best their goals. Gertner et al. (1994) claim that internal capital markets increase monitoring, increase managerial incentive and improve asset reallocation. However they leave out in their model the possibility that headquarter managers suffer from agency problems or that capital is constrained. They hypothesize that if headquarter managers suffer from agency problems firms with internal capital markets are more likely to make poor investments than firms that are financed by external capital markets. Lamont (1997) finds that if capital is constraint firms alter their investment policies and these decisions are not driven by profitability of its investment opportunities. Instead they are driven by the managerial motive to overinvest in poorly performing business segments in order to maintain diversification. Excess cash increases both the ability to diversify and the ability to maintain diversification. Therefore holding of excess cash fits well under the policies that reduce managerial risk.

The risk preferences of managers and shareholders can differ also in other direction meaning that managers are willing to take higher risks than shareholders would prefer. Managerial compensation systems are designed to align manager's interests with shareholder's interests. However no system is perfect and agency problems still occur. Managerial stock option plans have become very popular during the last two decades (Murphy, 1999) and by providing a direct link between managerial rewards and shareholders capital gains they should be an effective way to mitigate agency costs. However stock options do not completely replicate share ownership because they reward only stock price appreciation not shareholder capital gains which include also dividends. And because the value of options depends on share price volatility managers have an incentive to increase firm's risk by taking riskier projects than would be in the best interest of shareholders (Murphy, 1999).

Brookfield and Ormrod (2000) claim that managerial stock options affect investment decisions and the effect depends on the current value of the options. This argument is based on the valuation mechanism of options in which the price of options changes as the variance of stock returns changes. If options are well in the money (current share price is higher than exercise price) managers have an incentive to decrease risk by taking less risky projects and if options are out of the money (current share price is lower than exercise price) managers have an incentive to increase risks by taking as risky projects as possible.

They find support to this behaviour in their study of U.K. based firms during 1984-1995. They claim that this incentive effect can be especially harmful to the shareholders for two reasons. First out of the money options are a sign of declining shareholder wealth and the risk of the firm has already increased when the share price has declined. Despite of this, these options give managers an incentive to attempt even riskier projects in order to possibly benefit from their option plans. Secondly the fact that these options are out of the money can mean that the managers have poor investment judgement and the existence of options gives them incentive to take even higher risks.

In these kind of circumstances stock options can increase agency costs and excess cash may enhance this effect by protecting managers from external monitoring and allowing them to take very risky projects. Recently it is claimed that options have made managers extremely greedy in the U.S. The chairman of the Federal Reserve Board Alan Greenspan claims that managers wanted to harvest stock market gains and therefore inflated reported earnings in order to keep stock prices rising[1]. If managers are willing to manipulate accounting it can be easily assumed that they are willing to take projects that maximize risk and their option value in the short-term.

[1] Federal Reserve Board's semiannual monetary policy report to the congress July 16, 2002.

3.3. Different time horizon

Byrd et al. (1998) argue that shareholders are concerned with the cash flows that the firm generates from current date into perpetuity. However the managers are appointed to their post only for a limited period so they are interested on the cash flows that occur when they hold their post. They argue that the horizon problem becomes more severe when manager approaches retirement. At that phase the manager will not be able to benefit from a new investment, which generates revenues after his retirement. Dechow and Sloan (1991) argue that the horizon problem becomes more severe when there is a strong link between the negative impact of the current investment decision on future short-term profitability, when there is a strong link between CEO compensation and earnings performance and when there is a weak link between CEO wealth and changes in firm value. They find that managers who are near retirement age cut investments in research and development. On the basis of this behavior one can expect that firms with excess cash suffer most from the horizon problem because it is in the managers interest to use this excess cash right away in a way that maximizes his own utility.

The shorter horizon of managers affects also accounting policies. Gul (2001) finds that managers who have a lot of free cash flow at their disposal will not use the inventory management system that maximizes shareholder's value. These managers choose FIFO system that maximizes firm income instead of LIFO, which minimizes taxes and maximizes shareholder's utility. He argues that by choosing FIFO managers will maximize their short-term compensation and increase their current job security. FIFO provides also an accounting procedure, which allows managers to hide their non-value maximizing expenditure from outside investors. Their additional finding that debt increases the likelihood of choosing LIFO, the value maximizing policy, gives more evidence to the argument that this is agency related decision. This is because debt is claimed to reduce agency costs between manager's and shareholders.

The horizon problem is also present when firms issue trade credit. By offering trade credit a firm can lengthen the period between delivering the goods and receiving the payment. This can lead to a situation where different time horizon between managers and shareholder affects the use of this financing and leads to conflicting interest between these two groups. Generally

trade financing has an important function, Biais and Gollier (1997) claim that asymmetric information between banks and firms can lead to a situation where positive net present value projects have to be rejected because of lack of funds. They claim that firms that lend to their customers have positive private information about their customers and by issuing trade credit this private information is shared with the banks as well. And when banks receive this information they will borrow to the firm that has been granted trade credit. They also argue that many managers reason their decision to offer trade credit with an argument that if they had not offered credit they would not have been able to sell at all.

According to Petersen and Rajan (1997) trade credit is the most important form of short-term external financing for firms in the U.S. They present three theories that try to explain why industrial firms extend credit to their customers when there are financial institutions like banks that should have an advantage in financing. A brief explanation of these theories and link between excess cash and trade credit is provided hereafter.

According to the financing advantage theory the supplier may have an advantage over financial institutions in assessing the creditworthiness of the customer, in the ability to monitor customers behavior and in forcing the customer to repay the credit. These advantages should allow suppliers to lend with a lower interest rate than financial institutions. This advantage theory can be split into three sources of cost advantage. The first source is advantage in information acquisition. According to this the supplier can gain and analyze information about the customer better than financial institutions. The second source is advantage in controlling the buyer. In some cases the buyer has not got many financially feasible alternative suppliers and the supplier can threaten to cut future supplies if the buyer does not meet his liabilities on time. The third source of advantage comes from the supplier's ability to salvage value from existing assets. In case the customer cannot pay the supplier can seize the goods that are supplied.

According to the price discrimination theory firms can utilize price discrimination through trade credit. They argue that the terms of trade credit do not depend on the credit quality of the borrower. Therefore the trade credit has the largest price reducing effect to low quality borrowers. Firms in this credit quality group are argued to be the most price elastic because they suffer from credit rationing, which makes external credit expensive for them. Therefore the use of trade credit lowers the effective price of the good and increases the potential

customer base. This can also be a way to increase total sales by selling to some customers with a lower price without losing any customers who are charged a higher price. The creditworthy customers will find trade credit expensive because they can access cheaper external financing from credit institutions. However the credit rationed risky customers will find the use of trade credit feasible because it can still be cheaper then other sources of financing that they can access to. In some cases the supplier can be interested in the long-term survival of the customer and to protect possible future revenues from this customer by giving this customer trade credit in the short-term.

According to the third theory transaction costs affect the use of trade credit. They claim that buyers may want to reduce their transaction costs of allowing obligations to accumulate and pay them on monthly or even quarterly basis instead of every time when they receive goods. Another form of transaction costs theory claims that firms that have very seasonal demand will suffer from costs of building a large inventory and warehousing it. They argue that if the firm offers trade credit carefully to certain customers it can manage its inventory better.

In their empirical study of small businesses Petersen and Rajan (1997) find that cash levels do not affect the amount of accounts payable or accounts receivable. However their sample consists of very small businesses, which do not really have separated ownership and management so it is possible that firms with severe agency problems are not included in this sample. Also the amount of excess cash cannot be considerable taking in account the mean total asset value of $130 000. Despite that they do not find evidence that cash affects trade financing they still believe that there is a connection between these two issues. They claim that "firms with high cash holdings may have enough cash to not require accounts payable financing, or may have hoarded cash to repay accounts payable. It is not a priori clear which effect should predominate." Despite that they do not find a clear relation with cash levels and trade credit they find that firms with good access to capital markets offer more trade credit than firms that have difficulties in raising funds and that the amount of offered trade credit increases with firm's margins. These findings can be linked to excess cash because excess cash means easy access to capital and the ability gain excess cash by high operating cash flows means high margins.

3.4. Effort problem

In all the previous problems managers exert less effort than the shareholders would expect because they make decisions, which are directly shareholder value decreasing. Even if a manager does not do anything that directly decreases shareholder value his lack of effort in everyday operations can be shareholder value decreasing. Unfortunately effort problems are not easy to show empirically. If they would be these problems probably would not exist. Therefore this section is based more on arguments than on direct empirical evidence.

The persistence of excess cash may be linked to the effort problem. Harford (1999) finds that only 17% of his U.S. sample firms have excess cash for two consecutive years. Opler et al. (1999) find slightly higher rate of persistence using also U.S. sample with a less strict measure for excess cash. They claim that the highest quartile of excess cash holdings seems to be a transitory state. Because more than 40 % of firms that are ranked in the highest quartile of excess cash holdings loose this position in the following year. They find that the main reason for changes in excess cash is changes in operating cash flows. They do not give a reason for these losses or to the relation to excess cash. However they hypothesize that managers may value their ability to use excess cash to absorb these losses. Jensen's (1986) arguments that managers waste or invest excess cash in organizational inefficiencies give a reasonable explanation for a part of these losses and would mean that managers exert less effort in maintaining profitability.

In Maloney and McCormick (1993) Grossman and Hart argue that managers in highly levered firms work harder because they face a greater threat of bankruptcy than managers in less levered firms. So if the probability of bankruptcy affects managerial effort one can expect that managers of firms with excess cash exert less effort because bankruptcy is not so probable due to their ability to cover losses with excess cash. Shleifer and Vishny (1989) also claim that managers who are performing badly and are threatened to lose their job are likely to move into new lines of business. This would mean that managers do not make the best effort to improve the performance of current business units but instead they try to find another way out and excess cash helps them in moving into new businesses.

Byrd et al. (1998) argue that managers who have a lot of outside activities are likely to put less effort in their main post than the shareholders would expect. They claim that these outside

activities can be for example corporate board memberships or high profile positions in charitable organizations. It is argued that most of the gains of these outside activities go to the managers who get more publicity, personal income and prestige. However every person's time is limited so it is expected that excessive outside activities reduce the effort that managers can put in the firm that they manage. Excess cash holdings give the managers the needed funds to gain positions for example in charity organizations and that can lead to reduced effort.

3.5. Opportunity costs of excess cash

Excess cash causes agency problems that may lead to shareholder value decreasing decisions. However management can act in the shareholders best interest meaning that it does not make any value decreasing investments or alter risk policies etc. despite it has excess cash. Even if management does not do anything that directly decreases shareholder wealth just by keeping excess cash the management does not maximise shareholder wealth because excess cash has at least the opportunity cost of returning these funds to shareholders. Foregone opportunities related to excess cash are for example decisions to increase payout to shareholders and thereby increase leverage. The decisions concerning payout and leverage have also signalling effects concerning management's expectations about future operating performance, which in term affect shareholder wealth.

3.5.1. Value creation effect of cash disbursements

Incremental cash disbursements or share repurchases are documented to create a positive share price shock (e.g. Nohel and Tarhan (1998) and Lie (2000)). Guay and Harford (2000) study what kind of information concerning cash flow permanence can be derived from the choice between dividend increases and share repurchases. They argue that the permanence of cash flow shocks affects the decision whether to increase dividends or to repurchase shares. This claim is based on the finding that dividends are considered a more permanent mean of distributing cash because they represent an ongoing commitment. Therefore these two means of cash disbursements would send very different signals concerning future cash flows. They claim that when investors cannot fully anticipate the permanence of a cash flow shock they use the firm's choice of payout method as an estimate of permanence. They find that dividend

increasing firms have the highest permanence of cash flow shocks followed by the repurchasing firms. And the firms that do not change their dividend or repurchasing policies have the lowest permanence of cash flow shocks. On the basis of this information the investors then update their estimates of cash flow permanence. When the investors have identified a cash flow shock as transient and management chooses to increase dividends they expect the share price reaction to the announcement to include an upward reassessment of cash flow permanence. Similarly when a repurchase is used distribute a cash flow shock that the investors believed to be relatively permanent, a downward reassessment of cash flow permanence is expected to be part of the share price reaction. Empirical results support these expectations and they find that the positive share price reactions to announcements of dividend increases are greater than the reactions to repurchases.

Jagannathan et al. (2000) study how current financial flexibility affects the choice of cash disbursement method. Their primary hypothesis is that dividends tie the firm to a certain payout level while repurchases can be temporary. Therefore a firm that values more its financial flexibility would choose repurchases because these do not obligate to future payments. They find that firms with higher operating cash flows are more likely to increase dividends and firms with higher non-operative cash flows are more likely to repurchase shares. The higher the volatility of cash flows the more probably the firm chooses repurchases. They also confirm the finding that after the payout increase cash flows of dividend increasing firms tend to be higher than repurchasing firms. The share price reactions between dividend increasing and repurchasing firms are also very different. Dividend increasing firms have significantly higher reactions during the year of payout change and in previous years than just repurchasing firms. They conclude that financial flexibility and share price valuation are important issues affecting the payout method decision.

By foregoing the decision to disburse excess cash the firm sends a negative signal to the markets concerning the permanence of cash flow levels, which may lead to negative share price reaction. In addition to this it looses the positive share price reaction that it would have experienced by disbursing excess cash.

3.5.2. Value creation effect of leverage

Leverage can be defined as the ratio of debt to total assets. If a firm does not increase its payout while its cash reserves increase due to positive cash flows its leverage will decrease. This can increase the potential of agency costs because debt is clamed to reduce agency costs. Jensen (1986) argues that debt forces managers to make constant payouts and therefore reduces firm's cash flows, which in turn reduces the agency costs of free cash flow. According to Easterbrook (1984) debt and dividends have principally the same effect in reducing agency costs, however the effect of dividends is less powerful because a firm does not have to pay dividends but it must pay its debts.

Several studies of leverage buyouts (e.g. Jensen (1986) and Kaplan (1989)) show a positive share price shock after the acquisition. This tells that agency costs are expected to decrease when leverage increases. Increases in debt can lead to positive shareholder returns also without changes in ownership. In a recent study Harvey et al. (2001) find that debt has significant effect on share price when a firm is expected to suffer from agency costs. They argue that when a firm in emerging markets issues international debt it will face stricter reporting requirements and limitations on its operating activity and this increased monitoring should increase shareholder wealth. They report positive cumulative abnormal returns related to initial offering of U.S. bonds and international bonds.

These finding can be linked to firms that have excess cash. If a firm has a lot of excess cash it probably does not have to issue any bonds to finance its operations especially if the management dislikes monitoring. On the contrary it will probably pay back its existing loans when they come due. If the shareholders of a firm that holds excess cash allow decrease in leverage they loose the positive returns associated with debt and are exposed to greater agency costs due to limited monitoring.

4. Excess cash and corporate governance

The conflicting interests between managers and shareholders create agency costs, and excess cash gives managers more means to obtain private benefits at shareholders cost. Shareholders know the existence of these conflicting interests and try to mitigate the costs arising from this problem with corporate governance. The governance should reduce the likelihood that a firm can become an excess cash holder. However if the governance fails and the firm gains excess cash it will give the management means to reduce corporate governance in the future.

4.1. Corporate ownership

The agency costs rise from the separation of ownership and control. Ownership structure can differ in many perspectives including the number of shareholders, fraction of shares owned by large shareholders and the fraction of shares owned by management. These different structures affect monitoring and managerial behaviour.

It is a common belief that currently most of the firms are owned by a large number of shareholders and therefore the separation of ownership and control should be very clear. (La Porta et al, 1999). This fragmented ownership structure creates a situation where every shareholder would benefit from monitoring but no single shareholder wants to use his resources in it because he can get the same benefit also when someone else does the work. This kind of ownership structure causes a free rider problem and can lead to minimal monitoring on behalf of minor shareholders. On the other hand if ownership is very diverse no single shareholder can drive his own benefits at the cost of other shareholders, which is very important for small investors. La Porta et al. (1999) study the ownership structure of publicly listed companies in 27 developed countries around the world. They find that in contrary to the common belief many firms especially outside the U.S. have controlling shareholders, usually a family or a state. They also find that controlling shareholders have control in the firm beyond to their control rights given by their stock ownership. This is due to shares that give superior voting rights, pyramid ownership structures and cross-shareholdings. They define a firm a widely held if no shareholder owns more than 20% of firm's voting rights. By this

definition they find that 36 % of the large firms in the world are widely held, 30 % are family controlled and 18 % are state controlled.

Large shareholders can be very beneficial to all shareholders because they have an economical incentive to monitor. This is because they receive reward from monitoring that is in excess of what they should receive on the basis of their ownership. Therefore the existence of large shareholders should increase monitoring and reduce management's ability to keep excess cash and use it in value decreasing projects.

Managerial ownership should also affect agency costs, because it increases the part of agency costs that the managers must pay by themselves. Jensen and Meckling (1976) argue that the greater the managerial ownership the lesser their incentive to shirk, take value decreasing projects and exert less effort than would be optimal. This can be demonstrated with an example where a manager takes a project that decreases firm value by €1 million. If the manager owns 0.1 percent of shares this projects costs him €1000, which is probably a lot less than the private benefits that the manager receives from this project. However if he owns 10 percent then the cost would be €100 000 and that can exceed the value of his private benefits. Managers can also bear the costs of their decisions by loosing their job. Dennis et al. (1997 b) claim that managerial ownership makes it more difficult to replace a manager and that it reduces both the power of internal and external governance system. Stulz (1988) supports this claim and argues that high levels of managerial ownership insulate managers from some corporate governance mechanisms and allow managers to conduct shareholder value decreasing policies.

Large shareholders and managerial ownership should both affect the agency costs of excess cash. Opler et al. (1999) find that low levels of managerial ownership are positively related to cash holdings but when managerial ownership increases beyond 5 % of the outstanding shares the relation disappears. By studying announcement period returns for large special dividends and self tender offers Lie (2000) finds that the investors consider excess cash value decreasing despite the firm has high level of insider ownership or large shareholders. Harford (1999) finds that insider ownership does not reduce the probability that a firm attempts to spend its excess cash in acquisitions. According to his findings inside shareholders are willing to accept the negative share price effect following the bidding announcement. Faleye (2001) finds that firms that suffer from excess cash and have large outside shareowners are more likely to be

challenged into a proxy contest, which is a procedure where current shareholders try to change the current management.

Anderson et al. (2000) find that CEOs of diversified firms (which are more likely to suffer from agency costs) have lower ownership than their colleagues in focused firms. However they do not find any difference in the level of large shareholders. Despite that large shareholders should increase monitoring Doukas et al. (2000) find that institutional ownership has no effect on the monitoring of managerial behavior. They argue that there is a lucrative relationship between institutional owners and managers, which reduces monitoring and benefits both this owner group and managers.

4.2. Board structure

While the evidence from different ownership structures ability to reduce agency costs is mixed corporate boards should look after that the management is monitored adequately. The board is elected by the shareholders and should represent the best interest of all shareholders. Its tasks include the appointment of top management, approval of major investments and financing decisions. However willingness or ability of board members to represent shareholder's interests is questioned. (Brealey and Myers, 1996, 371)

Byrd and Hickman (1992) argue that the composition of board of directors affects its ability to control managers. They define three groups of board members. The first group is inside directors who can be classified for example as corporate officers or retirees and members of their families. The second group is affiliated outside directors who are for example investment bankers or lawyers. Who are not full time employees of the firm but are somehow associated to it. The third group is outside directors. Who are for example private investors or business executives, more generally they are persons who have no affiliation with the firm. They argue that both inside and outside directors are needed on a board of directors and that their knowledge complements each other. The inside directors provide inside information about firm's operations and the outside directors provide expertise and objectivity in evaluating manager's decision. The outside directors are claimed to be able to ask simple and the most difficult questions, which insiders do not dare to ask because that might compromise their expertise or position.

They argue that the actions of the board members just like managers' actions depend on their incentives. The greater the incentives to monitor the greater the monitoring. Fama and Jensen (1983) claim that outside directors who hold multiple board of directors memberships have a greater incentive to monitor firm's decisions on the behalf of all shareholders. This is because these directors have made significant investments to gain all these directorships and gaining their reputation as decision experts. In order to protect this reputation they are willing for example to oppose a proposed acquisition if they consider it to conflict shareholders' interests even if this may compromise their position in the bidder's board of directors. If they supported an acquisition that is shareholder value decreasing their reputation, as a decision expert would suffer and they might loose all their directorships.

Empirical evidence between board structures and its ability to monitor managers is scarce. By using their above mentioned classification of three board member types Byrd and Hickman (1992) find that when outside directors hold at least half of the seats of the bidder's board the return on shareholders on acquisition bids becomes on average more favourable. However when the most of the board member are outsiders this favourable effect on returns disappears. Lie (2000) does not find that a board with outside members would reduce the value destruction effect of excess cash by studying announcement period returns of excess cash disbursements.

4.3. Market for corporate control

According to Byrd et al. (1998) the market for corporate control is seen as the final resort to control managers and reduce agency costs when the internal means of corporate control fail. The market for corporate control works as following. When investors realize or expect that a firm suffers from agency cost in terms of poor assets utilization or poor strategic decisions they incorporate the anticipated agency costs into the share price, which consecutively declines. The declining share price attracts the attention of potential buyers who believe that they can manage the firm more efficiently and thereby increase its market value in the future.

Jensen (1986) argues that the market for corporate control played a crucial part in reducing the agency costs in the 1980's in the American oil industry when firms had a lot of free cash flow.

The market of corporate control led to mergers and acquisitions, which reduced the capital spending and excess capacity. The fact that managers know that their position is in threat if they do not act in the best interest of shareholders should reduce effort problem. Also the existence of external control can affect the behavior of corporate boards. Dennis et al. (1997b) claim that when there is a threat of external control in terms of possible takeover the board will feel more need to control current management team, which has shown poor performance. They report increased managerial turnover after increased activity in the market for corporate control.

Despite that the market of corporate control is an effective mean of reducing agency costs there is evidence that it may loose its effectiveness when the target has excess cash. Faleye (2001) argues that excess cash improves target firms ability to prevent a hostile takeover. This is due to that cash enhances the power of existing takeover defenses, which include repurchasing stock, acquiring a competitor of the bidder, issuing a bid for the acquiring company and engaging negative net present value operations. He argues that excess cash can be used to repurchase shares and repurchases can increase the share price, which makes takeover more expensive. Excess cash can also be used to acquire a competitor that reduces the possibility of takeover because that might lead to decreased competition and create an illegal monopoly.

These arguments that excess cash decreases takeover probability have empirical support. Harford (1999) and Pinkovitz in Faleye (2001) find that the probability to become acquired is negatively related to excess cash levels. Dann and DeAngelo (1988) find that defensive corporate restructurings, which require financial flexibility, after a takeover bid result into wealth losses of target shareholders and reduce significantly the probability that a hostile takeover will succeed.

4.4. Security analysis

Easterbrook (1984) argues that outside monitoring is in the collective interest of all shareholders. One source of this kind of monitoring is security analysis. Jensen and Meckling (1976) argue that monitoring activity of security analysts helps to mitigate the agency problems. Currently the role of security analysts has been questioned because they have been

alleged of giving misleading recommendations in order to benefit other divisions of their investment bank[2].

Doukas et al. (2000) argue that security analysis is a same kind of external monitoring device as independent board of directors, bond rating and market for corporate control, that restricts managers from conducting shareholder value decreasing policies. They also claim that the effectiveness of security analysis is related to the diversification. The more diversified the firm the more likely are non-value maximizing managerial policies. And as the firm becomes more diversified the security analysis becomes more difficult. They also find that agency costs measured as interaction between firm's growth opportunities and its free cash flows are negatively related to the intensity at which security analysts follow publicly traded firms. They state that security analysts do not only send information to the investors but they also restrict managerial misconduct. They also find that more security analysts follow diversified firms and that they have more resources at their disposal than security analysts that follow focused firms. Despite these resources the monitoring activity of diversified firms is much less effective in terms of reducing shareholder value destroying managerial policies than in focused firms.

These findings support the view that managers can reduce monitoring by following certain strategies and excess cash makes it easier to follow these strategies. There are also other firm characteristics that determine how much analyst coverage a firm will receive. Chung and Jo (1996) find that security analysts prefer to follow stocks of high quality firms. This is because it is easier to market these shares. They measure the quality of firm by Tobin's q, R&D and advertising expenditure and NYSE listing. Other variables that affect analyst coverage are firm size and trading volume.

[2] Kauppalehti 02.08.2002 Kolumni: Ei enää analyysia vaan markkinointia

5. Hypotheses

Excess cash causes conflicting interests between shareholders and managers concerning the use of these funds. The severity of these agency costs depends on how well the corporate governance system works. The sample countries differ in many perspectives concerning corporate governance. The most important differences are in ownership structure, legal system, market maturity and managerial values. The first three variables affect the severity of excepted agency costs. The managerial values reflect on manager's goals, which can be either maximization of shareholder or stakeholder wealth. Stakeholder wealth maximization requires that managers avoid policies that are harmful to employees, therefore they should avoid cut backs in labour in case of unexpected economic slowdown, which requires financial flexibility.

H1: *Excess cash is most common in countries that have the highest expected agency costs and where managers concentrate on stakeholder wealth maximization*

Excess cash isolates managers from monitoring. Managers probably value this effect at most when they make investment decisions that are difficult to justify. The free cash flow hypothesis (Jensen, 1986) and the evidence of Harford (1999) suggest that managers use excess cash in acquisitions, implying that substantial excess cash will be used in the future. He also finds that the operating performance of the merged firm is weak and therefore its ability to gain excess cash in the near future is low. Opler et al. (1999) find that the main reason for the loss of excess cash is negative operating cash flows. This suggests that in case of decreased performance firms will use their excess cash in covering losses. This evidence implies that firms will either spend their excess cash or they will use it to cover future operating losses. It is also expected that the longer a firm holds excess cash the higher is the pressure to distribute it back to the shareholders because they notice that the firm has no use for these funds.

H2: *Very few firms hold substantial excess cash for several years*

The previous hypothesis claims that excess cash will be used or lost instead of distributing it back to shareholders. In case it is used it should increase firm's economic activity in terms of

acquisitions and additional projects, which in turn should results into increasing sales. The ability to increase sales should be greater in firms that have excess cash because these firms can increase sales by taking negative net present value projects that are out of reach of cash constrained firms. Because the external markets are not be willing to finance these projects. However if the sales growth is obtained by non value maximizing projects it should result into decreased profitability.

H3: *Firms that have excess cash can grow faster and benefit less from sales growth than firms without excess cash*

The previous arguments claim that excess cash will be used to increase sales and the sales growth will be less profitable than current operations. However if excess cash is not used in increasing sales it can be used to organisational inefficiencies that are designed to increase managerial utility (Jensen, 1986). Opler et al. (1999) do not find that excess cash significantly increases capital expenditure or acquisitions. However they find that excess cash is lost because of negative operating cash flows. These cash flows must take place soon after a firm is ranked as an excess cash holder because they find only limited persistence of excess cash.

H4: *Current level of excess cash is negatively related to the future operating performance*

Excess cash makes diversification easier because it reduces outside monitoring and it can be used to finance diversifying acquisitions. Harford (1999) finds that excess cash holding firms have a tendency to make diversifying acquisitions. He also finds that these acquisitions result into decreased performance of the merged firm. This should reduce the likelihood that this firm becomes an excess cash holder in the future. Lamont (1997) claims that diversified firms develop internal capital markets, which allow the firm to invest cash flows from profitable units to less profitable units. Shin and Kim (2002) present recent evidence arguing that diversified firms are more likely to make more inefficient investments than their single segment peers and in general their capital expenditure is greater than their growth opportunities would imply. Therefore it can be expected that these firms will not let excess cash to accumulate but they use it instead.

Excess cash (Doukas et al., 2000) and diversification both reduce outside monitoring and therefore they can be substituting policies for management to reduce monitoring. Excess cash

has less value for diversified firms so it is expected that these firms rather use the cash. This leads to the conclusion that excess cash gives birth to diversification but current excess cash holders are less diversified than no excess cash holding firms.

H5: *Current degree of diversification and excess cash holdings are negatively related*

The theoretical part provides a link between excess cash and agency problems in asset utilization. By definition excess cash cannot be used to any value increasing projects and therefore firms that have excess cash should use their assets more inefficiently than their non excess cash holding peers. This inefficient use of asset can be detected by studying the asset utilization rate defined as the ratio of total annual sales to total assets. This ratio measures how efficiently managers use their assets. Singh and Davidson (2002) claim that a low asset utilization rate means poor asset management and shareholder value destruction because assets are used in unproductive purposes. Therefore excess cash should be negatively related to sales-to-assets ratio.

H6: *Firms that have excess cash have lower asset utilization rates than firms that do not have excess cash*

Excess cash allows firms to offer more credit to its customers and extend the repayment scheme without having to raise new funds. The motive for this kind of behaviour can be an attempt to improve competitiveness and to increase market share. It can also be that the borrowing customer would not be able to buy the goods at all because it may not receive financing from the external markets at a reasonable price. By lending to its customers management can increase firm's sales and risk because it is not known whether the customer can pay back. The increasing sales send a positive signal to investors concerning growth opportunities, which can be reflected on share price assuming that the investors cannot correctly evaluate the risk of trade financing. This increases the value of manager's stock options and his managerial reputation. If the manager can for example exercise his options or move to another firm before the true outcome becomes public he can gain the benefit of increased risk while the true outcome will be borne by shareholders. This kind of behaviour of increasing sales on the short term fits very well Byrd's (1999) argument of manager's shorter horizon.

Myers and Rajan (1995) offer additional insights about the behaviour of cash rich firms. They argue that firms that have unusually liquid core assets are best suited to offer financing to other firms in the economy. They also claim that excess liquidity gave birth to merchant-bankers who made short-term credit available to their customers. Therefore it can be expected that firms, which have excess cash may act as banks.

H7: *Excess cash holdings are positively related to trade debtors-to-sales ratio*

Firms that have excess cash do not need any external financing so it is unlikely that these firms would use trade credit offered to them. Excess cash also reduces monitoring and according to Tufano (1996) managers dislike monitoring. By accepting trade credit monitoring would increase because now the supplier would want to monitor the firm in order to secure its debt. It can be reasonably assumed that firms that have excess cash are also the creditworthiest because their asset base is very liquid. Myers and Rajan (1995) argue that creditworthy firm's can bypass banks and borrow directly from the markets. If they can do this then they probably do not need trade credit, which is more expensive than bank credit.

H8: *Excess cash should be negatively related to the trade creditors-to-sales ratio*

6. Methodology and data

6.1. Methodology and variables

This section presents first a model for cash holdings and explanation for the variables used in this model and secondly a summary how this model is used in practise. In order to evaluate cash holdings a model, which produces suggested level of cash is required. I will use a regression equation developed by Opler et al. (1999) as a model for this "normal" cash holdings level. This equation does not give an optimal level of cash holdings but instead it gives a linear approximation for cash-to-assets ratio based on the values of key variables that should explain cash holdings. Because my sample consists of different countries and industries and the availability of some data is very scarce I have made some adjustments to the original equation. These adjustments are the inclusion of country and industry dummies and the use of different proxies for industry cash flow volatility and for the cost of financial distress. After these adjustments the equation is the flowing:

$$Cash_{i,t}=a_i+b_1MTB_{i,t}+b_2SIZE_{i,t}+b_3CF_{i,t}+b_4NWC_{i,t}+b_5CAPEX_{i,t}+b_6LEVERAGE_{i,t}$$
$$+b_7INDSIG_{i,t}+b_8FINDIS_{i,t}+b_9DIVDUM_{i,t}+b_{10}COUDUM1_{i,t}+_{...}+b_{25}COUDUM15_{i,t}$$
$$+b_{26}INDDUM1_{i,t}+...+b_{44}INDDUM18_{i,t}+\varepsilon_t \quad (1)$$

CASH (cash-to-assets ratio) is the dependent variable, which measures excess cash. It is defined as the natural logarithm of the ratio of cash and cash equivalents to total assets less cash. Cash and cash equivalents is defined as the sum of loans receivable in less than one year, deposits, other liquid assets and current investments.

MTB (market-to-book ratio) is defined as market value of equity divided by the sum of ordinary shareholder's equity and intangible assets less total intangible assets. It is used as a measure of investment opportunities, the higher market-to-book ratio the higher the investment opportunities. This ratio is expected to be positively related to cash holdings because greater investment opportunities require greater funding.

SIZE (total assets) is the natural logarithm of total assets. It is expected that cash levels are negatively related to firm size. This expectation is based on the fact that larger firms have better access to the capital markets due to for example credit rating. Therefore they should need to hold smaller cash reserves.

CF (cash flow) is defined as the ratio of cash flow to total assets less cash. The definition for cash flow is earnings before interests and taxes plus depreciation and amortization less net interests less total tax charge less ordinary dividends. It is expected to be positively related to cash levels because the more a firm generates cash the more it will have it unless payout is increased.

NWC (net working capital) is the ratio of current assets less cash less current liabilities to total assets less cash. It is expected to be negatively related to cash levels because it measures asset substitution. Meaning the amount of assets that can be substituted for cash.

CAPEX (capital expenditure) is defined as the change in net fixed assets (after deducting accumulated depreciation) plus depreciation in year t divided by assets less cash. This variable is expected to be positively related to cash levels because firms need cash to finance capital expenditure.

LEVERAGE is defined as the ratio of total debt to total assets. It is expected to be negatively related to cash holdings because cash and debt can be considered to be substitutes. High leverage is usually related to low cash levels and vice versa.

INDSIG (industry sigma) is defined as the mean standard deviation in the ratio of cash flow to assets less cash in each industry. Industries are defined by two-digit SIC codes. This variable is expected to be positively related to cash level because firms have to be prepared to a situation where their cash flows are significantly lower than on average.

FINDIS (financial distress) is a proxy for the costs of financial distress. It is defined as the ratio of R&D expenditure to total sales. This is a problematic measure because different accounting standards differ largely in the definition of R&D expenditure and also many firms do not disclose their figures. I assume that each firm in one industry has the same R&D-to-sales ratio and this ratio stays constant in every country. This cost of financial distress is

expected to be positively related to the cash levels because the higher the cost of financial distress the more cash the firm has to hold in order to avoid these costs.

DIVDUM (dividend dummy) is a binary variable, which is set to one if the firm pays dividends and to zero otherwise. Dividends are defined as ordinary dividends. This variable is expected to be negatively related to cash levels because dividends are paid from funds that would otherwise be included in cash and equivalents.

COUDUMs (country dummy) are binary variables. Each country has its own country dummy, which is set to one if the firm is based in that country and to zero otherwise. These variables are expected to be both negatively and positively related to cash levels depending on expected agency costs.

INDDUMs (industry dummy) are binary variables. I have divided the sample into 17 key industries and into one industry, which has all firms that do not fit into any of the key categories. Each industry has its own industry dummy, which is set to be one if the firm operates primarily in that industry and to zero otherwise. These variables are expected to be both negative and positive depending on industry characteristics.

My process of identifying firms with excess cash holdings has three stages. In the first stage I need five-year averages from all regression variables of each firm. Then I run the cross sectional regression and get the coefficients for all regression variables. By placing these coefficients and values from all variables of firm i in year t into the regression equation I can find out the suggested cash to assets ratio for that firm in that year. The residual value meaning the difference between suggested cash-to-assets ratio and real cash-to-assets ratio tells if the firm has more or less cash than expected. Then I will rank the firms annually into different quartiles according to these annual residuals.

This regression model does not address to my hypotheses presented in section 5. It is used only to control variables that affect the need for cash holdings and to find out the differences in suggested and actual cash-to-assets ratios. The main research hypotheses are generally studied by performing tests of difference in means between different excess cash rankings.

6.2. Sample data

The sample data consists of 1096 firms (5480 firm years) that have annual observations of all required data items for a five-year period between 1996-2000. These firms are located in fifteen countries in various parts of the world. The data covers a wide range of economies but is slightly concentrated in smaller European economies in terms of the number of sample countries due to limited data availability. The data consists mainly of financial statement items, which are downloaded from the Datatsream database. Some financial statement items that were not available in Datasream are collected from the Worldscope Global Researcher CD-Rom (July 2001). In addition to that exchange rates are from Datastream and industry identification codes (SIC-codes) are from Worldscope.

6.2.1. The sample selection process

The use of the regression model requires 20 different financial statement items, which have to be downloaded separately by each country. In order to save time predefined lists that consist of the major firms in one country are used. Every country is set a limit that it should have complete data from at least twenty firms. Despite of the large number of firms in each country's list only a fraction of these firms have all needed items. Due to this I have to exclude countries like Italy and Spain, which have only few firms with sufficient data to calculate cash flow. In many cases these predefined country lists cause so many consecutive errors that the download process is abandoned. Therefore significantly fewer firms than there would have been available in Australia, Japan and U.K are obtained. After all items are downloaded from the countries that seem to have sufficient number of firms matching the data of each country can be started. Each downloaded financial statement item contains different number of firms and I have to match all items from one firm and see that the firm does not have any missing observations. This matching process required a lot of work because for each country I had about 20 excel sheets that had to be combined. During this process significant number of firms were lost especially because they did not have the needed items to calculate annual operating cash flow.

After matching all financial statement items from all firms this data is needed to be combined with Worldscope data that has SIC codes allowing industry rankings and diversification study. Also all firms that operate primarily in the financial sector (SIC codes 6000-6999) have to be

removed because cash holdings have a different function in financial firms. The matching of these two data samples had to be done manually because most of the firm names were written slightly differently. For example Stockmann vs. Oyj Stockmann Ab, which made alphabetical matching impossible.

6.2.2. Descriptive characteristics and statistics of the sample

The sample consists of 15 countries and the distribution of firms within these countries is reported in Figure 1. The sample firms are quite evenly distributed into all sample countries, excluding the three largest countries. The cumulative portion of firms in these countries is 48 percent, but these were the only countries that had a large amount of firms and at least one large sub sample is needed to allow separate studies within one country.

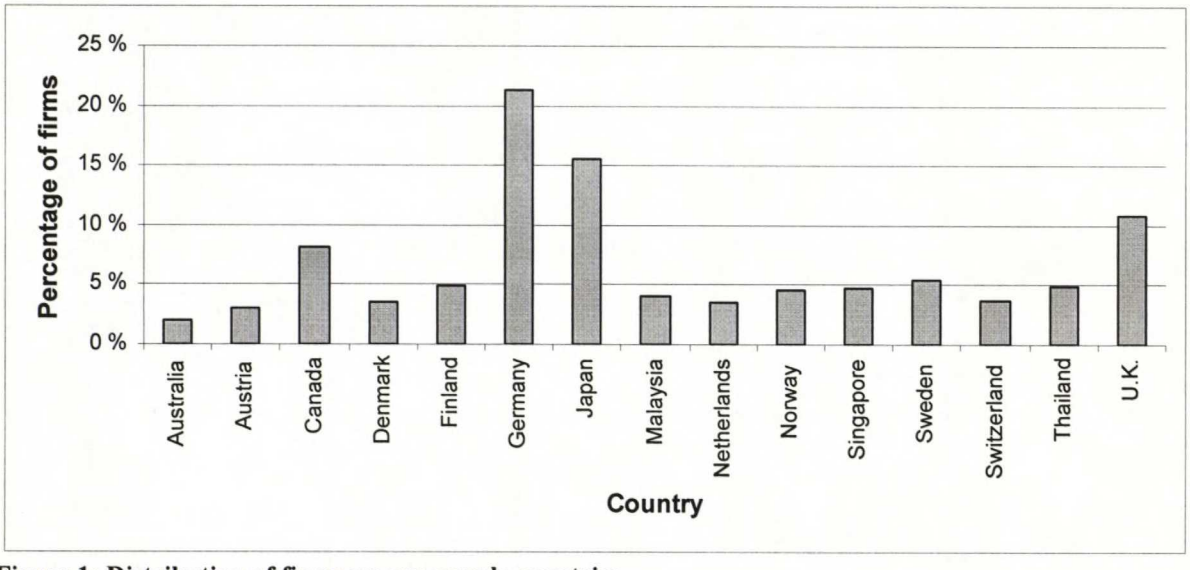

Figure 1: Distribution of firms among sample countries
This diagram shows how many percent of total 1096 firms are from each country.

These countries differentiate considerably in many terms including ownership structure, legal system and market maturity. The previous characteristics may affect to the expected agency costs and can therefore explain excess cash holdings. I claim that just the existence of excess cash itself increases the residual loss and the loss can increase if excess cash is used in shareholder value destroying purposes. Therefore excess cash should be most common in countries that are expected to have the greatest agency costs. I divide my sample countries into three groups according to expected agency costs (see Table 2). I base my expectations of agency costs on previous studies of country characteristics.

Harvey et al. (2001) argue that agency costs are most severe in emerging markets where the separation of ownership and control is inefficient. They argue that in these markets owners and managers have greater control than their cash flow rights would justify. They also argue that emerging markets have poor shareholder protection and poorly developed legal systems. The final weakness of these markets is their lack of market for corporate control. From the 18 emerging markets defined in Harvey et al. (2001) only three are included in my sample. These countries are Malaysia, Singapore and Thailand. On the basis of these findings I believe that these three countries have the highest expected agency costs.

I rank the remaining countries into two groups according to the diversity of ownership and the quality of legal system. The more widely held the firm the lower the expected agency cost. This is because a large investor base implies investor trust and does not allow a single owner to drive his own purposes at the cost of other shareholders. The higher the quality of legal system the lower the expected agency costs. La Porta et al. (1998) argue that common law countries provide the best investor protection and French civil law countries the weakest. German and Scandinavian civil law countries fall in between of these two groups.

I assume that countries that have low expected agency costs have both good legal protection and wide shareholder base. By combining the results from La Porta et al. (1998) and (1999) I find that only three countries in my sample have both good legal protection and diverse ownership. These countries are Australia, Canada and U.K. Other countries in my sample have medium expected agency costs either because of the weakness of legal protection or limited diversity in ownership.

Table 2: Expected agency costs in sample countries
This table divides sample countries into three groups according to expected agency costs. Groupings are based on market maturity, ownership structure and quality of legal system.

Country	Expected Agency Costs		
	Low	Medium	High
Australia	X		
Austria		X	
Canada	X		
Denmark		X	
Finland		X	
Germany		X	
Japan		X	
Malaysia			X
Netherlands		X	
Norway		X	
Singapore			X
Sweden		X	
Switzerland		X	
Thailand			X
United Kingdom	X		

My sample can also be divided into different industries. The distribution of firms among 18 industry groupings is presented in Figure 2. Each industry contains at least 20 firms and they are classified by two-digit SIC codes. The industry classifications follow Teoh et al. (1998) but are slightly modified. SIC codes for all industry groupings are presented in appendix. Figure 2 shows some concentration of firms into certain industries. The three largest industries are Manufacturing, Transportation, and Paper and paper products, which account for 37 percent of all firms. This distribution is not surprising because most of the countries are old industrial countries and the firms have to be quite large to be included in the Datastream database. Therefore the number of information technology firms is small. The fact that sample firms are among the largest ones in each sample country may affect the quality of many instances that try to mitigate agency costs including security analysis. Therefore it is possible that firms having the highest agency costs are not included in this sample.

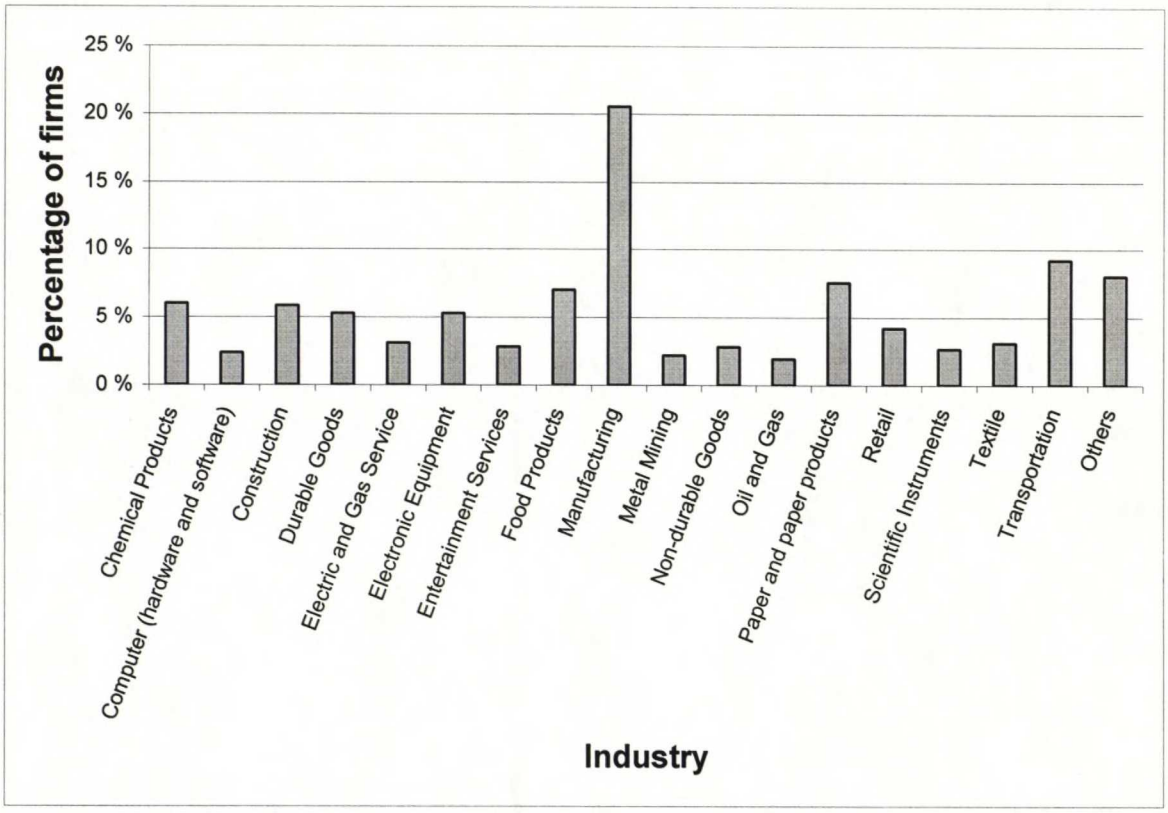

Figure 2: Distribution of firms among sample industries
This figure presents how the sample firms are divided into different industries. Each industry grouping contains at least 20 firms.

Descriptive statistics of the key variables by countries and industries are reported in Tables 3 and 4. These tables present the average values of key variables by country and industry and comparison between these values and the average value of the whole sample. The purpose of these comparisons is to make interpretation of future results more meaningful. These values also enable comparison between cash levels and excess cash level in latter parts of the study.

The results from tests of difference in means in Table 3 show that the variables fluctuate a lot according to different countries and on average statistically significant differences are almost as common in every variable. The smallest number of these differences is in cash-to-assets ratio and the largest in market-to-book ratio and in size. The distribution of statistically significant differences among countries shows greater variation. The highest number of these differences is in Japan (7) and the lowest in Canada (1).

Table 3: Average values for key variables by country
This table presents the five-year average values of key variables in sample countries. In all variables that have assets as denominator it is defined as assets less cash and equivalents. Cash is the ratio of cash-to-assets, where cash is defined as cash and equivalents. Market-to-book ratio is defined as market value of equity divided by the sum of ordinary shareholder's equity and intangible assets less total intangible assets. Size is defined as the value of total assets in millions of US dollars. Cash flow is cash flow from operations, defined as earnings before interest and taxes plus depreciation, less interest, taxes and dividends divided by assets. Net working capital is the ratio of networking capital-to-assets less cash where NWC is defined as current assets less cash less current liabilities. Capital expenditure is defined as change in fixed assets plus depreciation divided by assets. Leverage is defined as debt over total assets. T-statistics, presented in parentheses, are for tests of difference in means between each country's variables and the whole sample mean of that variable.

Country	Cash-to-assets ratio	Market-to-book ratio	Real size	Cash flow-to-assets ratio	Networking capital-to-assets	Capital expenditure-to-assets	Leverage
Australia	0.07	2.54	2 279	0.04	0.04	0.06	0.19
	(-7.13)***	(0.53)	(0.39)	(-2.35)**	(-0.76)	(-1.05)	(-1.83)*
Austria	0.14	1.98	678	0.10	0.08	0.08	0.23
	(-1.14)	(-1.10)	(-4.31)***	(1.94)*	(0.79)	(1.33)	(-0.29)
Canada	0.17	2.25	2 292	0.08	0.04	0.12	0.25
	(0.14)	(-0.50)	(0.84)	(0.27)	(-1.41)	(6.00)***	(1.035)
Denmark	0.21	2.24	908	0.12	0.07	0.09	0.26
	(1.65)	(-0.38)	(-2.93)***	(4.29)***	(0.33)	(2.37)**	(1.09)
Finland	0.15	2.29	1 888	0.10	0.05	0.08	0.24
	(1.09)	(-0.23)	(1.91)*	(2.26)**	(-0.68)	(1.22)	(0.15)
Germany	0.13	2.79	1 904	0.09	0.16	0.07	0.20
	(-3.25)***	(3.29)***	(0.07)	(1.58)	(6.60)***	(1.34)	(-3.19)***
Japan	0.22	1.47	3 495	0.04	-0.02	0.03	0.30
	(4.34)***	(-8.06)***	(1.67)*	(-9.43)***	(-5.628)***	(-6.28)***	(3.93)***
Malaysia	0.20	1.85	963	0.08	-0.05	0.08	0.11
	(0.82)	(2.80)***	(2.57)**	(-0.01)	(3.45)***	(0.97)	(7.72)
Netherlands	0.12	2.79	2 588	0.10	0.09	0.09	0.23
	(-2.04)*	(1.42)	(0.75)	(1.92)*	(1.20)	(2.19)**	(-0.19)
Norway	0.18	2.66	951	0.08	0.03	0.11	0.31
	(0.69)	(1.01)	(-2.10)**	(-0,04)	(-1.59)	(3.39)***	(2.74)***
Singapore	0.18	1.82	406	0.06	-0.01	0.06	0.24
	(0.60)	(2.19)**	(5.79)***	(1.65)	(2.78)***	(-0.99)	(0.29)
Sweden	0.13	2.83	1 642	0.09	0.19	0.09	0.18
	(-2.01)**	(-1.84)*	(-0.39)	(0.15)	(6.93)***	(2.65)***	(3.36)***
Switzerland	0.23	3.28	1 959	0.13	0.12	0.04	0.23
	(1.97)*	(2.33)**	(0.09)	(3.20)***	(2.21)**	(-3.37)***	(-0.52)
Thailand	0.15	1.55	606	0.07	-0.13	0.07	0.41
	(-0.83)	(-4.09)***	(-4.74)***	(-0.28)	(-5.96)***	(0.56)	(3.76)***
U.K	0.16	2.79	1 834	0,08	0,07	0,06	0,18
	(-0.54)	(2.02)**	(-0.05)	(0.06)	(0.41)	(-0.97)	(-4.02)***

***, **, * Significant at the 1, 5, and 10 percent levels, respectively.

The results in Table 4 show that when the sample is grouped by industries the number of statistically different observations decreases. Only one industry group does not differ in any variable from the whole sample average. This group is Non-durable goods. Each of the industry groupings have at most four variables that differ from the mean of the whole sample, while in country grouping Japan's values in all variables are different from the whole sample mean. More interesting results are found by studying the differences in each variable. There

are only two industries that differ in terms of leverage. These are Transportation, which has significantly higher average and Computer, which has significantly lower average than the whole sample average. However in terms of networking capital 14 out 18 industries differ from the whole group's average. This is quite interesting and it seems that this variable is the most industry specific. The reasons for this can be that different industries have different timing of cash flows and therefore firms have significantly different needs for working capital. Once again the cash-to-assets ratio does not seem to have great differences, only four industries have significantly different values and three of these are only modestly significant.

Table 4: Average values for key variables by Industry
This table presents the five-year average values of key variables in sample industries. In all variables that have assets as denominator it is defined as assets less cash and equivalents. Cash is the ratio of cash-to-assets, where cash is defined as cash and equivalents. Market-to-book ratio is defined as market value of equity divided by the sum of ordinary shareholder's equity and intangible assets less total intangible assets. Size is defined as the value of total assets in millions of US dollars. Cash flow is cash flow from operations, defined as earnings before interest and taxes plus depreciation, less interest, taxes and dividends divided by assets. Net working capital is the ratio of networking capital-to-assets less cash where NWC is defined as current assets less cash less current liabilities. Capital expenditure is defined as change in fixed assets plus depreciation divided by assets. Leverage is defined as debt over total assets. T-statistics, presented in parentheses, are for tests of difference in means between each industry's variables to the whole sample mean of that variable.

Country	Cash-to-assets ratio	Market-to-book ratio	Real size	Cash flow to assets ratio	Networking capital to assets	Capital expenditure to assets	Leverage
Chemical products	0,20 (1.65)	2,55 (0.78)	1 972 (0.19)	0,09 (1.36)	0,09 (1.31)	0,06 (1.82)*	0,24 (0.22)
Computer	0,22 (1.81)*	3.91 (3.24)***	262 (-7.22)***	0,07 (-0.46)	0,05 (-0.26)	0,07 (0.30)	0,16 (-2.71)**
Construction	0,18 (0.85)	1,52 (-5.39)***	1 182 (-2.20)	0,05 (-3.73)***	0,04 (-0.81)	0,04 (-3.83)***	0,20 (1.52)
Durable goods	0,16 (-0.28)	2,36 (0.07)	1 463 (-0.38)	0,07 (-0.57)	0,15 (3.99)***	0,04 (-4.02)***	0,22 (-0.67)
Electric and gas service	0,18 (0.40)	2,36 (0.10)	3 501 (1.18)	0,09 (1.31)	-0,03 (-4.68)***	0,07 (0.07)	0,19 (-1.26)
Electronic equipment	0,17 (0.28)	2,88 (1.79)*	2 913 (0.90)	0,09 (0.87)	0,15 (3.52)***	0,06 (-1.36)	0,21 (-1.08)
Entertainment	0,16 (-0.17)	2,77 (0.98)	253 (-7.44)***	0,06 (-1.37)	-0,12 (-4.66)***	0,07 (0.02)	0,30 (1.68)
Food products	0,13 (-1.86)*	2,46 (0.55)	1 180 (-1.26)	0,09 (1.62)	0,02 (-2.67)***	0,08 (0.95)	0,21 (-1.62)
Manufacturing	0.16 (-0.05)	2.05 (-2.48)**	1 642 (-0.56)	0,08 (-0.28)	0,12 (3.87)***	0,06 (-3.00)***	0,23 (-0.61)
Metal mining	0,21 (1.06)	1,84 (-2.29)**	1 321 (-1.14)	0,00 (-4.35)***	0,02 (-2.06)**	0,12 (3.05)***	0,19 (-1.70)
Non-durable goods	0,15 (-0.62)	2,29 (-0.17)	1 785 (-0.06)	0,09 (0.46)	-0,01 (-1.61)	0,06 (-0.98)	0,24 (0.02)
Oil and gas	0,12 (-1.77)*	2,97 (1.46)	1 302 (-1.44)	0,10 (1.78)*	0,00 (-2.34)**	0,20 (4.82)***	0,27 (1.09)
Paper and paper products	0,13 (-2.82)***	2,21 (-0.63)	1 507 (-0.90)	0,09 (2.54)**	0,09 (1.77)*	0,09 (2.52)**	0,23 (-0.50)
Retail	0,18 (0.63)	2,41 (0.21)	1 017 (-2.84)***	0,06 (-1.36)	-0,02 (-1.97)*	0,06 (-0.52)	0,20 (-1.40)
Scientific instruments	0,20 (1.00)	3,39 (2.37)**	1 000 (-1.65)	0,08 (0.02)	0,21 (4.87)***	0,05 (-2.86)***	0,21 (-0.99)
Textile	0,13 (-1.26)	2,06 (-0.72)	281 065 (-7.11)***	0,06 (-1.21)	0,18 (3.57)***	0,04 (-3.21)***	0,26 (0.80)
Transportation	0,16 (-0.43)	1,97 (-2.12)**	4 068 (1.46)	0,08 (0.59)	0,01 (-2.82)***	0,08 (1.95)*	0,35 (5.46)***
Other	0,17 (0.25)	2,68 (1.58)	2 954 (1.01)	0,09 (1.87)*	-0,04 (-5.13)***	0,09 (2.95)***	0,25 (0.38)

***, **, * Significant at the 1, 5, and 10 percent levels, respectively.

7. Empirical research

7.1. Regression results

I will first test how the variables of the regression equation estimate the normal cash level in my sample firms. Secondly I will show how the suggested cash-to-assets ratios differ from the actual observed annual cash-to-assets ratios. The regression results presented in Table 5 show which variables are statistically significant in explaining cash-to-assets ratio.

These results from the regression are quite similar to the results of Opler et al. (1999) in terms that the coefficients have similar signs. Market-to-book ratio is positively related to cash levels and it is statistically significant (5 percent level). Size has also the expected sign but it lacks statistical significance. Despite the use of natural logarithm in this variable to smoothen differences the standard deviation seems to be too high, which decreases the statistical significance. The large differences in size are caused by country differences (see Table 3). Cash flow has the expected sign and it is statistically significant (1 percent level). Net working capital has also the expected sign and it is also statistically significant (1 percent level). Capital expenditure does not seem to affect negatively cash levels, which is against to my expectations. However this variable is not statistically significant. This result is not surprising because the same variable has also a negative sign in Opler et al. (1999) when they use cross sectional regression. Possible reasons for this unexpected relation can be that my values for capital expenditure are not accurate because I use an approximation instead of a value from the flow of funds statement due to lack of data.

Leverage is negatively related to cash levels, which supports my expectations. Furthermore this relation is statistically significant (1 percent level), it has the highest t-value of all regression variables. Industry sigma follows the expected relation but lacks statistical significance. This is not surprising because this measure is not very robust due to short time period. The financial distress dummy, which caused some problems already in the data collection period, has an unexpected sign and furthermore it has moderate statistical significance. It has also the same sign in Opler et al. (1999) when they use cross sectional regression but it is not statistically significant. The use of research and development expenses as a measure of costs of financial distress may not be the best alternative. Because the same

measure has been used to approximate growth options as well (e.g. Guedes and Opler (1996)). However even if it would be a better approximation for growth options it would still need to have a positive coefficient. The dividend dummy is negatively related to cash levels as expected but is not statistically significant. The inaccuracy in this measure can cause the lack of statistical significance. Because for firms that pay dividends at least three times this dummy gets value one and for firms that pay two times or less it gets value zero.

The country and industry dummies cause multicollinearity. Therefore I have to exclude one country and one industry dummy from my regression's independent variables set. These excluded countries and industries will act as benchmarks when the results are interpreted. I exclude the country dummy that represents U.K. and the industry dummy that represents Manufacturing industry. On the basis of the theoretical part I believe that agency costs and cash holdings are positively related. I use U.K. as a benchmark because it has low expected agency costs and a large number of firms. I do not have any expectations concerning the agency costs of different industries and the key variables should be able to capture major differences in industries. Therefore I choose the industry that has the largest number of firms.

My expectations concerning the signs of country dummy coefficients are based on their expected agency costs related to my benchmark country. I expect that countries that have medium or high expected agency costs should have a positive coefficient. The two countries that have also low agency costs are expected to have either positive or negative signs but the coefficients should be very close to zero. The results are mixed concerning these two countries Canada's coefficient is almost zero and it is statistically insignificant. However Australia's coefficient is –0.418 and it is statistically significant at 5 percent level. This is probably due to a very small number of firms (21). All other countries excluding Germany and the Netherlands have positive coefficients. The negative values of these two countries are very close to zero and lack statistical significance. Examination of the countries that have positive coefficients reveals interesting results. First the countries in emerging markets that should have the greatest coefficients on the basis of expected agency costs are not among the top three. The highest coefficients are in Japan (1.1), Norway (0.6) and Switzerland (0.7), all these values are statistically significant (1 percent level). According to these results it seems that the relation between expected agency costs and cash holdings is not so straightforward.

The interpretation of industry dummies is more challenging. I do not have any anticipation on what industries should have the highest agency costs. These expectations should be based on industry characteristics that the key variables do not measure. One possible issue could be analyst coverage. If analysts follow and understand some industries better than others then one could expect that the industries that receive maximum coverage and the greatest understanding have the smallest expected agency costs. Only six industries have positive coefficients meaning that firms in these industries generally hold more cash than firms in manufacturing industry. However, only three of these coefficients are statistically significant. From the remaining 11 industries that have negative coefficients six are statistically significant.

As already mentioned and reported in Tables 3 and 4 most of my key variables have quite high standard deviation. This leaves my model with a quite moderate explanation power. The value of adjusted R square 0.28 is lower than 0.38 in Opler et al. (1999). Meaning that 28 percent of the deviation in cash to assets ratio can be explained by the regression variables. My model has also a lot more explaining variables so one could expect the adjusted R square to be higher. Without country and industry dummies the adjusted R-square is about 0.14 and with country dummies but without industry dummies the value is about 0.28. Despite that the industry dummies do not increase explanatory power they have an important role of making the regression results more comparable.

Table 5: Regression predicting firm cash holdings

The dependent variable is natural log of cash-to-assets ratio. In all independent variable denominators, assets are net of cash and equivalents. Market-to-book ratio is defined as market value of equity divided by the sum of ordinary shareholder's equity and intangible assets less total intangible assets. Size is defined as the value of total assets in thousands of US dollars. Cash flow is cash flow from operations, defined as earnings before interest and taxes plus depreciation, less interest, taxes and dividends. Net working capital is the ratio of networking capital to assets less cash where NWC is defined as current assets less cash less current liabilities. Capital expenditure is defines as change in fixed assets plus depreciation. Leverage is defined as debt over total assets. Industry sigma is defined as the mean standard deviation in the ratio of cash flow to assets less cash in each industry. Financial distress is defined as average R&D to sales ratio in each industry. Dividend dummy is set to one if the paid dividends during the five-year period, and set 0 if not. Industry and country dummies are set to one if a firm is from that country or industry, and set to 0 if not.

Independent variable	Expected sign	Coefficient	T-value
Intercept		-2.416	-9.18***
Market-to-book ratio	+	0.030	2.03**
Real size	-	-0.002	-0.13
Cash flow to assets	+	2.864	6.64***
Net working capital to assets	-	-0.740	-4.03***
Capital expenditure to assets	+	-0.436	-0.85
Leverage	-	-2.074	-11.49***
Industry sigma	+	1.265	1,11
Financial distress	+	-2.564	-1.90*
Dividend dummy	-	-0.040	-0.43
Country dummy Canada	+/-	-0.009	-0.06
Country dummy Australia	+/-	-0.418	-1.98**
Country dummy Denmark	+	0.540	3.12***
Country dummy Germany	+	-0.113	-1.05
Country dummy Japan	+	1.107	9.19***
Country dummy Netherlands	+	-0.255	-1.48
Country dummy Norway	+	0.624	3.89***
Country dummy Sweden	+	0.212	1.43
Country dummy Austria	+	0.272	1.15
Country dummy Switzerland	+	0.623	3.64***
Country dummy Thailand	+	0.518	3.23***
Country dummy U.K.		-	-
Country dummy Singapore	+	0.356	2.29**
Country dummy Malaysia	+	0.056	0.34
Country dummy Finland	+	0.371	2.42**
Industry dummy Chemical products		0.236	1.71*
Industry dummy Computer		0.288	1.22
Industry dummy Construction		0.181	1.20
Industry dummy Durable goods		-0.033	-0.24
Industry dummy Electric and gas service		-0.059	-0.34
Industry dummy Electronic equipment		0.104	0.75
Industry dummy Entertainment		-0.164	-0.90
Industry dummy Food products		-0.270	-2.13**
Industry dummy Manufacturing		-	-
Industry dummy Metal mining		0.486	1.95*
Industry dummy Non-durable goods		-0.439	-2.46**
Industry dummy Oil and gas		-0.404	-1.80*
Industry dummy Paper and paper products		-0.249	-2.07**
Industry dummy Retail		-0.111	-0.72
Industry dummy Scientific instruments		-0.027	0.14
Industry dummy Textile		-0.177	-1.01
Industry dummy Transportation		0.243	2.14**
Industry dummy Other		-0.043	-0.35**
Adjusted R square		0.278	
F		11.521***	

***, **, * Significant at the 1, 5, and 10 percent levels, respectively.

7.1.1. Excess cash estimates

I compare each firm's suggested cash-to-assets ratio to the actual cash-to-assets ratio for that year. If the actual value is higher (lower) the firm has more (less) cash than suggested by the model. The interpretation of the difference between actual and suggested values (regression residual) requires some explanation because the actual cash-to-assets ratios are in logarithm scale. The antilog of residual tells how much excess cash a firm has compared to its suggested cash holdings. For example if the residual is 1 it tells that the firm has 187 percent excess cash (antilog of 1 is 2.87 which is 187%).

I group firms into four quartiles according to their positive excess cash holdings. Each firm is ranked into a certain quartile of cash holdings annually. Quartile number one contains 25% of firms that hold least excess cash and quartile number 4 contains 25% of firms that hold most excess cash. Negative excess is ranked following the same principle. Summary statistics of residual values are presented in Table 6. This table shows that maximum values for positive excess cash are higher than maximum values for negative excess cash. The groupings are overlapping because firms are ranked into quartiles in each year and the amount of excess cash required to each ranking fluctuates annually. The regression equation coefficients are based on five-year average values and the use of annual values will increase the distribution of residuals. The maximum residual increases to 18.5 from 4.5. However average (-0.01) and median (0.07) values for the whole sample are close zero, which suggests that the use of annual values does not significantly affect the results.

Table 6: Distribution of annual residuals
Annual residual of the cross sectional regression provides a measure for excess cash. Firms that have more cash than suggested by the regression have positive residuals. Each firm is ranked annually into a quartile according to its residuals.

	Average	Median	Standard deviation	Maximum	Minimum
Whole sample	-0.01	0.07	1.12	18.52	-6.15
Positive residuals:					
Quartile 4	1.63	1.47	0.80	18.52	1.04
Quartile 3	0.87	0.87	0.13	1.17	0.63
Quartile 2	0.50	0.49	0.10	0.70	0.29
Quartile 1	0.16	0.16	0.10	0.37	0.00
Negative Residuals:					
Quartile 1	-0.15	-0.15	0.09	0.00	-0.34
Quartile 2	-0.49	-0.49	0.11	-0.28	-0.73
Quartile 3	-0.93	-0.90	0.16	-0.65	-1.32
Quartile 4	-2.00	-1.80	0.77	-1.16	-6.15

7.2. *Existence and persistence of excess cash by sample countries and industries*

7.2.1. Existence of excess cash

The annual ranking of firms according to excess cash holdings allows tests of the first hypothesis, which claims that there should be a difference in the existence of excess cash between sample countries. The percentage of annual excess cash rankings in each quartile by country is presented in Table 7 Panel A. It is expected that 12.5 percent of annual residuals should result to ranking into each of the four quartiles. The reaming fifty percent of annual residuals should be ranked into group zero, which consists of all negative excess cash quartiles.

The results show that in nine countries more firms than expected are ranked in the fourth quartile. The highest frequency of fourth quartile rankings is in the Netherlands (19 %), Canada (18 %) and Malaysia (18 %). The difference between the expected frequencies and actual frequencies in these countries is above thirty percent. From the six countries where the frequency of fourth quartile rankings is lower than expected I can identify three countries where the difference is the most significant. These countries are Switzerland (3 %), Sweden (6%) and Japan (6%). All these countries have at least fifty percent less firms in the fourth quartile than expected. These results show that substantial excess cash defined as fourth quartile ranking is significantly more common in some countries. However the countries where it is the most common are not the ones that have the highest expected agency costs defined in section 6.2.2.

Comparison of these results with the results in Table 3 show that Japan and Switzerland have the highest cash-to-assets ratios and still they have the lowest frequency of substantial excess cash. This suggests that pure cash-to-assets ratios do not tell the whole truth about cash levels. It is also interesting to study the group of negative excess cash and its relation to the highest quartile of excess cash. It seems that in all other countries than Japan and the Netherlands negative excess cash is less common than expected.

The first hypothesis claims that managerial values should affect also to existence of excess cash. It seems that countries where managers concentrate on shareholder wealth maximization do not differ in the frequency of fourth quartile rankings from the countries where stakeholder wealth maximisation is managers' main focus. This seems to be the case because for example Canada (18 %) and Germany (17%) have very similar and above expected frequencies of substantial excess cash.

Results in Table 7 Panel B reveal that in different industries the observed frequencies of excess cash rankings are also quite different from the expected ones. In the following industries the frequency of fourth quartile ranking is over thirty percent higher than expected. Entertainment (20 %), Oil and gas (20 %), Retail (19 %) and Electric and gas service (18 %). Industries where the frequency of fourth quartile rankings is over thirty percent lower than expected include Construction (8 %) and Electronic equipment (9 %). These findings are interesting especially because firms in Oil and gas industry have significant amounts of excess cash. When studying the agency costs of free cash flow Jensen (1987) used this industry as a sample industry. This suggests that my model really identifies excess cash holding firms and firms in Oil and gas industry have still a tendency to hold excess cash.

The results support the hypothesis that there are differences in the existence of excess cash between different countries. However, the reasons for these differences are not related to expected agency costs as I assumed in my hypothesis. On the whole it is not feasible to draw conclusions on agency costs of different countries and industries on the basis of these results. It may be that excess cash is only temporary and distributed back to shareholders as soon as it is possible.

Table 7: Distribution of excess cash among sample countries and industries
Each firm is ranked five times into a certain quartile of positive excess cash or into the group of negative excess cash. This table presents how many percent of these annual excess cash rankings result to classification into each five possible groups. In Panel A each country's rankings are studied separately and in Panel B each Industry's rankings are studied separately.

Panel A: Percentage of excess cash rankings into following groupings by country					
	Quartile 4	Quartile 3	Quartile 2	Quartile 1	Group 0
Country:					
Australia	14	10	11	21	44
Austria	14	14	15	12	44
Canada	18	11	14	9	49
Denmark	16	11	15	14	45
Finland	8	15	16	13	49
Germany	17	16	11	10	46
Japan	6	11	13	19	50
Malaysia	18	13	12	11	47
Netherlands	19	9	8	12	53
Norway	11	16	13	14	45
Singapore	12	12	13	14	49
Sweden	6	15	14	16	49
Switzerland	3	14	22	22	41
Thailand	16	12	12	11	49
U.K.	17	12	16	11	44
Panel B: Percentage of excess cash rankings into following groupings by industry					
Industry:					
Chemical Products	9	14	13	12	51
Computer	12	8	15	12	54
Construction	8	15	15	13	49
Durable Goods	11	14	15	16	44
Electric and Gas Service	18	16	8	11	47
Electronic Equipment	9	13	13	18	47
Entertainment Services	20	6	18	13	43
Food Products	16	15	12	12	44
Manufacturing	13	12	13	14	48
Metal Mining	17	10	14	12	48
Non-durable Goods	17	11	10	14	48
Oil and Gas	20	10	11	13	46
Paper and paper products	11	15	16	12	47
Retail	19	8	10	15	49
Scientific Instruments	12	14	15	14	44
Textile	16	15	14	12	44
Transportation	10	16	14	14	45
Others	15	15	10	11	49

7.2.2. Persistence of excess cash

After ranking each firm annually into a certain quartile I can study the second hypothesis claiming that substantial excess cash is a transitory situation. A summary of the persistence of substantial excess cash is presented in Table 8 Panel A. This panel shows how many percent of firms in each country remain in the highest quartile from five to zero years. Only three percent of all firms remain in the highest quartile for the whole five-year period, suggesting

that substantial excess cash is a transitory situation because 30 percent of all firms are ranked in the highest quartile at least once.

The strongest persistence of fourth quartile rankings is in Malaysia where seven percent of firms hold their position in the highest quartile for the whole sample period. Other countries where at least five percent of firms remain in the highest quartile for five years are Canada, Denmark and U.K. It is interesting to find that there are five countries where not a single firm remains in the fourth quartile for five years. Surprisingly the persistence of highest quartile ranking does not increase when firms are allowed to leave the highest quartile for one year. This suggests that firms that loose their position in the highest quartile cannot regain it in the following year. Naturally if a firm looses its excess cash in year five it does not have the opportunity to regain that ranking within my sample time period. By comparing the results of Table 7 and Table 8 I find that the countries where excess cash is the most persistent are not necessarily the same where excess cash is the most common. Four countries, which have the largest percentage of fourth quartile rankings, are Canada, Netherlands Malaysia and U.K. From these countries only Malaysia and Canada show great persistence. While in the Netherlands not a single firm can retain fourth quartile ranking for the whole sample period. Countries that have the lowest percentage of fourth quartile rankings (Japan, Switzerland and Sweden) have also lower than average persistence of these rankings.

Panel B in Table 8 presents the persistence of both positive and negative excess cash holdings. This panel shows that 29 percent of all firms have positive excess cash for the whole sample period. The most important result is that the persistence of positive excess cash is much stronger than negative excess cash. About 21 percent of sample firms have lower cash-to-assets ratio for the whole period than estimated by the regression model. This suggests that managers seem to want to keep the firm in excess cash for the whole time. The persistence of negative excess cash can imply that the performance of these firms is so poor that they cannot gain excess cash. This leads to an argument that managers can affect the decision whether to keep excess cash or not but rising from negative excess cash requires changes in profitability.

The country comparisons show that Denmark and Switzerland both of which have very low persistence of substantial excess cash show great persistence in positive excess cash. In Switzerland only 13 percent of firms have negative excess cash for the whole sample period. Otherwise the results in panel B are quite mixed in terms that high persistence of positive

excess cash does not necessarily mean low persistence of negative excess cash. This finding could mean that in these countries firms do either constantly well or poorly and a smaller percentage of firms can become excess cash holders or experience loss of excess cash.

Table 8: Persistence of excess cash

Panel A shows how many percent of firms in each country are ranked into the fourth quartile of excess cash from 0 to 5 years. Panel B shows how many percent of firms in each country are ranked into the quartiles of positive excess cash from 0 to 5 years.

Panel A: Percentage of firms that remain the following number of years in the highest quartile of excess cash

Country	Number of Years					
	5	4	3	2	1	0
Australia	0	4	0	17	17	61
Austria	3	3	0	15	15	65
Canada	6	2	6	8	20	58
Denmark	5	8	3	0	13	71
Finland	0	2	4	2	15	77
Germany	4	4	5	9	15	64
Japan	2	1	1	4	4	87
Malaysia	7	0	9	4	20	60
Netherlands	0	13	8	5	8	66
Norway	2	0	4	6	22	66
Singapore	4	0	4	6	16	71
Sweden	0	3	0	3	10	83
Switzerland	0	0	3	0	5	93
Thailand	2	2	6	13	21	57
U.K.	5	3	7	6	16	63
Whole sample	3	3	4	6	14	70

Panel B: Percentage of firms that remain the following number of years in quartiles of positive excess cash

Country	Number of Years					
	5	4	3	2	1	0
Australia	17	22	17	17	17	9
Austria	47	0	9	0	18	27
Canada	27	11	14	12	12	24
Denmark	32	11	11	16	13	18
Finland	28	28	28	28	28	28
Germany	30	13	9	10	15	22
Japan	31	6	9	12	17	25
Malaysia	29	11	16	4	22	18
Netherlands	29	8	5	16	13	29
Norway	32	12	4	20	16	16
Singapore	26	12	14	10	20	20
Sweden	25	8	22	8	13	23
Switzerland	35	10	10	20	13	13
Thailand	25	9	15	13	21	17
U.K.	27	15	14	14	13	17
Whole sample	29	11	11	12	15	21

The persistence of substantial excess cash by industry groupings is presented in Table 9. The percentages reported in this table show that there is a greater deviation in the highest quartile persistence among industries than countries. The most important result is that Oil and gas industry shows also great persistence in addition to great existence. The results in Table 7 show that in Oil and gas industry during the five-year sample period 20 percent of all annual rankings are in the fourth quartile. The results in Table 9 show that during the sample period 48 percent of firms in this industry are ranked at least once in the highest quartile and that 10 percent of these firms can retain this ranking for five years. Other industries that show a high number of excess cash observations are entertainment and retail, which have also high persistence. These results imply a possible link between persistence and existence of excess cash in some industries.

The results from the persistence of excess (not reported) cash in different industries do not reveal anything new. The three industries, which have the highest persistence of positive excess cash are Electric and gas service (38 %), Oil and gas (33 %) and Scientific instruments (34 %).

Table 9: Persistence of excess cash by industries
This table shows how many percent of firms in each industry are ranked in the fourth quartile of excess cash from 0 to 5 years.

Panel A: Percentage of firms that remain the following number of years in the highest quartile of excess cash

	Number of Years					
Industry	5	4	3	2	1	0
Chemical Products	3	0	3	8	8	79
Computer	0	4	4	8	15	69
Construction	0	3	3	3	9	81
Durable Goods	0	3	7	5	12	72
Electric and Gas Service	9	6	0	0	21	65
Electronic Equipment	0	3	3	7	7	79
Entertainment Services	6	0	10	6	26	52
Food Products	4	4	6	8	12	66
Manufacturing	3	4	4	5	15	69
Metal Mining	4	0	8	4	29	54
Non-durable Goods	6	3	3	10	10	68
Oil and Gas	10	0	5	5	29	52
Paper and paper products	1	1	4	11	11	72
Retail	11	2	4	4	11	67
Scientific Instruments	3	3	0	7	17	69
Textile	3	3	3	12	21	59
Transportation	3	1	4	5	11	76
Others	1	7	3	8	16	65
All industries	3	3	4	6	14	70

On the whole I find support to the hypothesis that excess cash is a transitory state. The evidence from a link between the existence and persistence is mixed. Although accumulation of certain industries into certain countries could explain country differences I do not find that countries where existence and persistence is the highest would have significantly more firms in industries that have high existence or persistence of excess cash.

7.2.3. Changes in excess cash rankings

Previous results show that firms experience frequently changes in their excess cash rankings. Only very few firms are able to hold their position in the highest ranking of excess cash. In this section I am going to study these changes in more detail. The number of observations during the five-year period where a firm gains or looses its position in the highest quartile is reported in Table 10.

Assuming that excess cash is a result of operating cash flows and builds up gradually it is expected that the largest number of firms that rise to the fourth quartile in year t are ranked in the third quartile in year t-1. The results in Table 10 support this assumption. The second largest group that gains position in the highest quartile holds negative excess cash in the previous year. This group is four times larger than other quartiles but still it is quite unexpected that so many firms experience such a sharp and sudden increase in ranking. This implies that managers can also suddenly have excess cash under their control instead of collecting it during many years.

Table 10: Changes in excess cash rankings
This table presents the distribution of excess cash rankings before a firm gains position in the highest quartile and its new position following the loss of its position in the highest quartile.

Grouping before rise	Number of firms	Grouping after loss	Number of firms
Quartile 3	115	Quartile 3	102
Quartile 2	36	Quartile 2	62
Quartile 1	22	Quartile 1	23
Group 0	55	Group 0	51
Total	228	Total	238

The evidence so far suggests that firms are very likely to experience reduction in their excess cash rankings. Next I will try to find the reason for this loss by studying the behaviour of key variables that could explain this change. Possible reasons according to Opler et al. (2000) are operating losses, changes in payout, acquisitions or changes in capital expenditure.

Unfortunately Datastream does not have sufficient data from acquisitions so I have to exclude this variable. I also include market-to-book ratio into these possible reasons for change because this ratio can have quite high values and many of the sample firms experience quite drastic changes in this ratio.

Table 11: Changes in rankings and correspondent changes in variables
This table presents a change in excess cash ranking and the percentage of firms that experience also a decrease in cash-to-assets ratio, decrease in cash flow-to-assets ratio, increase in market-to-book ratio and an increase in capital expenditure-to-assets ratio and increase payout ratio. Payout ratio is defined as ratio of dividends per share divided by net earnings per share.

Change in excess cash ranking	Decrease in cash-to-assets	Decrease in cash flow-to-assets	Increase in capital expenditure-to-assets	Increase in payout	Increase in market-to-book
4-3	81 %	43 %	55 %	57 %	46 %
4-2	90 %	34 %	61 %	65 %	47 %
4-1	96 %	48 %	70 %	61 %	34 %
4-0	98 %	50 %	60 %	72 %	46 %

The changes in cash-to-assets ratio tell whether the change in ranking is caused by changes in cash levels or because of changes in other regression variables. Table 11 shows that small decreases in excess cash rankings are more likely to take place without a change in cash-to-assets ratio than large changes. 81 percent of firms that move from the fourth quartile to the third quartile experience a decrease in cash-to-assets ratio while 98 percent experience this decrease when they move from the fourth quartile to the group zero. This suggests that the most of all changes in ranking are caused by changes in cash levels and the larger the change the more probable it is that cash levels change. The next three variables may explain why the cash-to-assets ratio changes.

The fact that at most only 50 percent of firms that loose their excess cash experience a decrease in cash flows and from the 50 percent only 18 percent experience negative cash flows is unexpected compared to the findings of Opler et al. (1999). They find that the main reason for the loss excess cash is negative operating cash flows. Increases in capital expenditure are more common, 55 to 70 percents of firms increase capital expenditure in the year they loose excess cash. However the most common reason for the loss of excess cash seems to be increase in payout as 57 to 72 percent of firms increase payout. Increases in market-to-book ratio are also quite common when firms loose excess cash. From 34 percent to 47 percents of firms experience an increase in market-to-book ratio in the year they loose excess cash. These results do not tell the whole truth about the reasons for the loss of excess cash because the magnitude of these changes is not taken into account. Increases in dividends

can have very small effects to firm's cash level. While negative operating cash flows can cause significant decreases in cash levels.

I assume that the most dramatic decrease in excess cash holdings should reveal the most important reason for the loss of excess cash. I study the average cash flow-to-assets ratios, capital expenditure, payout and market-to-book ratios for firms that experience a loss in rankings from the highest quartile to the group of negative excess cash. The results reported in Table 12 provide little support to the claim that negative cash flows are the main reason for loss of excess cash. The difference in cash flow-to-assets is statistically insignificant between firms that loose excess cash and firms that retain or hold negative excess cash. In support to Harford (1999) I find that firms that loose excess cash (4-0) have higher capital expenditure than firms that retain their cash levels and this difference is statistically significant when compared to the group zero (0-0) (5 percent level) and to the first quartile (1-1) (1 percent level). Increases in payout do not seem to cause decrease in excess cash because firms that loose their position in the highest quartile to the lowest ranking have significantly lower payout ratios than firms that remain in the group of negative excess cash or in the first quartile. The difference is statistically significant at 5 percent level to firms that constantly hold negative excess cash or are in the first quartile. The results from market-to-book ratio are insignificant.

Table 12: Average values for three variables after a change in rankings
The first column presents a change in excess cash rankings between year t and t+1. The four following columns report the values of mean cash flow-to-assets ratio, capital expenditure-to-assets ratio, payout ratio and market-to-book ratio in year t+1. T-statistics for tests of difference in means from 4-4 to 0-0 are reported in parenthesis.

Change in excess cash ranking	Cash flow-to-assets	Capital expenditure-to-assets	Payout	Market-to-book
4-4	0.075 (0.17)	0.076 (1.97)**	0.267 (-0.88)	2.033 (-1.48)
4-0	0.063 (-0.73)	0.131 (2.64)**	0.114 (-2.23)**	2.961 (0.534)
1-1	0.077 (0.68)	0.058 (-0.73)	0.499 (1.08)	2.073 (-1.35)
0-0	0.073	0.062	0.343	2.301

***, **, * Significant at the 1, 5, and 10 percent levels, respectively.

7.3. *The effect of excess cash on sales growth and profitability*

7.3.1. Sales growth

The third hypothesis claims that excess cash allows firms to increase sales and the growth will be less profitable. In this section I will study just growth and leave profitability to the next section. Investors value sales growth highly so one can expect that if managers have means to increase sales growth they will do it especially if their horizon is shorter than the whole investment horizon. I argue that excess cash can be a mean to achieve or at least attempt to increase sales by e.g. by acquiring other firms. Previous studies (Harford, 1999) show that managers of cash rich firms are more likely to acquire firms. And even if they do not acquire firms the negative net present value projects that managers are more likely to take (Jensen, 1986) probably increase sales as well. If the firm distributes all of its excess cash the increase in sales will probably be slower than in the case that it uses these funds to previously mentioned purposes. Alternatively managers can waste excess cash in organisational inefficiencies and in excessive perks, which do not increase sales at all. Because it is most likely that managers try to increase shareholder wealth in addition to their own utility I believe that they attempt to increase sales.

I assume that there is a lead lag relationship between excess cash rankings and sales growth. If a firm is ranked in the highest quartile of excess cash in year t its sales will increase more in year t+1. Table 13 shows the excess cash rankings from the previous year and the percentage of firms that increase sales in the following year. The differences in probabilities of positive sales growth are insignificantly different between the fourth quartile (64 %) and the group of negative excess cash (63 %). It seems that cash levels do not affect the direction in the change of sales. However cash levels affect the average increase and decrease of sales as reported in Table 13. The highest average positive growth rate is the fourth quartile (21 %). This is higher than in the group zero (19 %) or in the first quartile (17 %). The difference between the highest and lowest excess cash ranking is statistically insignificant but when the fourth quartile is compared to the first quartile the results gain statistical significance (5 percent level). In case firm experiences sales decrease excess cash holdings seem to make this decrease more severe. The results show that the highest sales decrease is in the fourth quartile

(-0.15) and this is statistically significantly higher than in the group of negative excess cash or in the first quartile (1 percent level).

Table 13: Probability of sales growth by excess cash rankings
This table presents excess cash rankings in year t and the probabilities that these firms experience sales growth in year t+1. Also mean average growth and decrease rates in sales between year t and t+1 are presented. T-statistics are for tests of difference in means between these values from quartile 4 to group zero.

Ranking	Probability of sales growth	Average sales growth	T-stat	Average sales decrease	T-stat
Quartile 4	64 %	0.217	1.41	-0,151	-2.9***
Quartile 3	68 %	0.173	-1.13	-0,111	0.48
Quartile 2	72 %	0.162	-2.44**	-0,122	-0.48
Quartile 1	68 %	0.172	-1.36	-0,104	1.19
Group 0	63 %	0.190		-0,116	

***, **, * Significant at the 1, 5, and 10 percent levels, respectively.

In order to provide better analysis of the relation between excess cash and sales growth I study the changes in sales and the changes in excess cash rankings. Because my sample is not large enough to allow the study of changes with two sub samples for sales increasing and declining firms I have to combine firms that experience a decrease and an increase in sales. Average sales growth for each excess cash ranking using rankings from the previous year is reported in Panel A in Table 14. It shows that sales growth for combined sample is quite similar in all excess cash groupings. No quartile has significantly different values and all values are positive. These values are consistent with the previous table because it shows that the majority of firms experience positive sales growth and that average growth is higher than average decline.

Panel B in table 14 shows the change in sales for corresponding changes in excess cash rankings. The highest growth rate (0.09) is for firms that loose their ranking in the highest quartile and are ranked in the group of negative excess cash. This implies that rapid growth decreases cash holdings. Firms that remain in the group zero have the second highest growth rate (0.079). The average growth rate for firms that remain in the highest quartile (0.05) is statistically significantly lower (five percent level) than the growth rate of firms that remain in the group zero (0.08). The results show that excess cash in year t allows rapid growth in year t+1 but this growth will reduce excess cash ranking in that year. These results do not support the results of Brush et al. (2000) showing that cash holdings as a whole increase sales growth. However, in case sales grow excess cash from previous years seems to accelerate growth. Therefore I find support to the sales growth hypothesis.

Table 14: Average change in sales and excess cash rankings
This table presents excess cash rankings in year t and average sales growth between year t and t+1. Panel A reports only excess cash ranking in year t and Panel B reports a change in excess ranking between year t and t+1. T-statistics are for tests of difference in means from quartile 4 to group zero in panel A and from 4-4 to 0-0 in panel B.

Panel A: Ranking and sales growth			Panel B: Change in ranking and sales growth		
Ranking in year t	Average change in sales	T-Stat	Change in ranking	Average change in sales	T-Stat
Quartile 4	0,070	-0,64	4-4	0,046	-2,22**
Quartile 3	0,074	-0,43	3-4	0,029	-2,33**
Quartile 2	0,086	0,69	2-4	0,031	-0,98
Quartile 1	0,083	0,44	1-4	-0,029	-3,17**
Group 0	0,078		0-4	-0,002	-2,46**
			4-0	0,093	0,25
			0-0	0,079	

***, **, * Significant at the 1, 5, and 10 percent levels, respectively.

7.3.2. Profitability of sales growth

Findings from the previous section imply that sales growth with excess cash is less profitable because it seems to decrease cash holdings. In this section I will study how sales growth affects EBIT-to-sales ratio. This ratio is commonly used as a measure of operating margin and it ignores all financial items. Therefore any changes in cash levels or interests should not affect this figure. I assume that if sales grow the probability of decreasing performance measured, as EBIT-to- sales ratio is positively related to excess cash holdings.

I study the probabilities that increase in sales will increase EBIT-to-sales ratio as well. The highest probability is in the fourth quartile where 56 percent of firms can increase profitability as their sales grow. This probability is higher than in the group zero where 51 percent of firms experience an increase in profitability. On the whole the differences are not significant. The values for the remaining quartiles are very similar, quartile 3 0.54, quartile 2 0.47 and quartile 1 0.51. The excess cash rankings are lagged by a year. The ability to increase EBIT-to-sales ratio despite decreasing sales is also an interesting question. The results show that the highest probability of increased EBIT-to-sales ratio when sales decline is in the fourth quartile 0.49. The lowest probability is in the second quartile 0.39 and the remaining groupings have probabilities between 0.39 and 0.46.

These probabilities suggest that sales growth is more profitable in the highest quartile than in other quartiles. I try to find additional evidence on this finding by studying the ratio of change in EBIT to change in sales. This ratio reveals how EBIT changes when there is a certain

change in sales. I have to decrease my sample size because this measure cannot be calculated if EBIT has negative values. There are about 300 firms that experience negative EBIT at least once during the sample period and have to be removed. My tests show that there are great differences in this ratio within excess cash rankings and between them. However all tests of difference in means between these rankings are statistically insignificant. Therefore I do not find any support to my hypothesis of a negative relation between excess cash holdings and the profitability of sales growth. Although firms that have the greatest amount of excess cash in year t may have the highest sales growth in year t+1 and subsequently these firms loose excess cash in year t+1.

7.3.3. Excess cash and EBIT-to-sales ratio

Hypothesis number four claims that firms suffering from excess cash will become less profitable because excess cash leads to non value increasing projects and acquisitions that decrease the performance of the merged firm. I will study if this is true also in my sample. In this section I will measure profitability with EBIT-to-sales ratio and in the next section I will introduce an alternative measure.

The results from the tests of differences in mean profitability between excess cash quartiles are reported in Table 15. The results in Panel A show that firms that are ranked in the highest quartile in year t have statistically significantly lower EBIT-to-sales ratio (0.04) (1 percent level) than firms in all other rankings in year t. Firms in all other rankings have quite equal values in terms of EBIT-to-sales. This is quite unexpected because excess cash should have more effects in the following year. And the highest quartile includes firms that have just gained position in this quartile and are therefore expected to have higher EBIT-to-sales ratios than firms in the other quartiles.

I also study how excess cash rankings from year t affect EBIT-to-sales ratio in year t+1. These results are reported in Panel B. Firms in the fourth quartile have still the lowest value (0.06) but the difference to the group of negative excess cash (0.08) is not so large anymore. This difference has only very moderate statistical significance (10 percent level). The best performance is in the second (0.08) and third (0.09) quartiles. The findings supports the claim

that current and history of substantial excess cash results in worse operating performance than a history of no or negative excess cash.

Table 15: EBIT-to-sales ratios for excess cash rankings
This table presents excess cash ranking in year t and in panel A average EBIT-to-sales ratio in year t and in panel B average EBIT-to-sales ratio in year t+1. T-statistics are for tests of difference in means from quartile four to group zero.

Panel A: EBIT-to-sales from year t			Panel B: EBIT-to-sales from year t+1	
Ranking	EBIT-to-sales	T-stat	EBIT-to-sales	T-stat
Quartile 4	0.035	-3.74***	0.056	-1.90*
Quartile 3	0.084	0.06	0.086	0.97
Quartile 2	0.089	0.79	0.081	0.57
Quartile 1	0.088	0.75	0.077	0.05
Group 0	0.083		0.077	

***, **, * Significant at the 1, 5, and 10 percent levels, respectively.

More information from the operating performance between different excess cash rankings can be found by comparing EBIT-to-sales ratios after a certain change in rankings. According to my hypothesis firms that remain or loose position in the highest quartile should have the worst performance. Results reported in Table 16 support partly my claims. The average operating performance of firms that remain in the highest quartile is significantly lower than the average performance of the firms that remain in the group zero. The difference between these two values (0.043 and 0.080) is statistically significant at 5 percent confidence level. What is more surprising is that firms that loose their position in the highest quartile and move to the lowest group are more profitable (6.9) than the firms that remain in the highest quartile. The difference between this group and the group of constant group zero is insignificant. Even more surprising are the findings where firms gain position in the highest quartile from lower quartiles. The average operating performance in all these changes is lower than in the group of constant fourth quartile. However these groups suffer from small number of observations and high standard deviation, which causes statistically insignificant t-values.

Table 16: Average EBIT-to-sales ratio for certain changes in excess cash rankings
This table presents certain changes in excess cash between year t and t+1 and corresponding average EBIT-to-sales ratio in year t+1. T-statistics are for tests of difference in means from 4-4 to 0-0.

Change in excess cash rankings	EBIT-to-sales	T-stat	Significance
4-4	0.044	-2.35	**
3-4	0.041	-1.28	
2-4	0.029	-1.67	
1-4	0.008	-1.60	
0-4	0.034	-1.56	
4-0	0.069	-0.27	
0-0	0.080		

***, **, * Significant at the 1, 5, and 10 percent levels, respectively.

I check the robustness of previous results by studying separately Germany and Manufacturing industry. I test how excess cash rankings from year t affect the average EBIT-to-sales ratio in year t+1 in different excess cash rankings. The results are very similar in Germany and in the Manufacturing industry showing that the EBIT-to-sales ratios are not statistically different between the highest quartile of excess cash and the group of negative excess cash or the first quartile. Because these results do not support my previous evidence and hypothesis I replicate these studies with the U.K. sample. Also these results are statistically insignificant.

As a whole my results are mixed. I do find evidence that excess cash results into lower EBIT-to-sales ratios. However this can be caused by country and industry specific differences because I am not able to find the same effect in my country and industry specific sub samples.

7.3.4. Excess cash and cash flow-to-assets ratio

In order to find more support to my hypothesis of negative relation between excess cash levels and operating performance I use an additional performance measure. Cash flow-to-assets ratio is fundamentally different from EBIT-to-sales ratio because it includes financing income from cash holdings into cash flow but does not include cash holdings into assets. Therefore if a firm has a lot of cash it will receive financing income but its assets base is the same if it had no cash. Because of this relation firms that have excess cash should have higher cash flow-to-asset ratios and also the changes in excess cash rankings should result to more dramatic changes in cash flow-to-assets. In addition the use of this ratio allows comparison between my results and the results in Opler et al. (1999).

As in the previous section I expect that the firms that have excess cash have lower cash flow-to-assets ratios than their no excess cash holding peers. However even if these ratios are equal firms that have excess cash are doing worse because they receive interest income from excess cash. The results in Table 17 show partly mixed evidence from difference of cash flow-to-assets ratios between different excess cash rankings. Results in Panel A support my hypothesis. The lowest cash flow-to-assets ratio is in the fourth quartile (0.052) and the highest in the third quartile (0.090). Most importantly the value in the fourth quartile is lower than the value in the group zero (0.078) and in the first quartile (0.08). Furthermore the differences are statistically significant at 1 percent confidence level. Actually the cash flow-to-assets ratio in the fourth quartile is significantly lower than in all other groupings. This suggests that in the year when a firm is ranked into the highest quartile its cash flow is significantly lower than firms', which have from medium to negative excess cash.

The results in Panel B where excess cash rankings are from the previous year are less supportive to my hypothesis. Firms that have negative excess cash have the lowest cash flow-to-assets ratio (0.067) and firms that are in the third quartile have the highest (0.097). The difference between the average cash flow-to-assets ratio in the fourth quartile (7.5) and in the group zero is statistically insignificant. I find that this also supports to my hypothesis because without the cash flows from excess cash this ratio in the fourth quartile firms would be lower. Comparison to the results in Opler et al. (1999) shows some similarities.

Table 17: Cash flow-to-assets ratios for excess cash rankings
This table presents excess cash ranking in year t and in panel A average cash flow-to-assets ratio in year t and in panel B average cash flow-to-assets ratio in year t+1. T-statistics are for tests of difference in means from quartile four to group zero.

Panel A: Cash flow-to-assets from year t			Panel B: Cash flow-to-assets from year t+1	
Ranking	Cash flow-to-assets	T-statistics	Cash flow-to-assets	T-statistics
Quartile 4	0.052	-3.95***	0.076	1.49
Quartile 3	0.090	2.36**	0.097	4.88***
Quartile 2	0.089	2.74**	0.085	4.08***
Quartile 1	0.080	0.51	0.072	0.92
Group 0	0.078		0.067	

***, **, * Significant at the 1, 5, and 10 percent levels, respectively.

I also study cash flow-to-assets ratios after a certain change in excess cash rankings. The results reported in Table 18 show that firms retaining their position in the highest quartile

have equal cash flow-to-assets ratios than firms retaining their position in the group of negative excess cash. The difference between these mean values (0.075 and 0.072) is statistically insignificant. I also find that firms that loose their ranking in the highest quartile have lower cash flow-to-assets ratio than firms that retain ranking in the highest quartile. This suggests that decrease in interest income reduces cash flows.

Table 18: Average cash flow-to-assets ratio for certain changes in excess cash rankings
This table presents certain changes in excess cash rankings between year t and t+1 and corresponding average cash flow-to-assets ratio in year t+1. T-statistics are for tests of difference in means from 4-4 to 0-0.

Change	Cash flow-to-assets	T-statistics	Significance
4-4	0.075	0.27	
3-4	0.065	-0.71	
2-4	-0.005	-3.29	***
1-4	-0.092	-2.99	***
0-4	-0.043	-3.48	***
4-0	0.063	-0.68	
0-0	0.073		

***, **, * Significant at the 1, 5, and 10 percent levels, respectively.

I evaluate the robustness of previous results by repeating tests of difference in means in cash flow-to-assets ratios between different excess cash rankings within Germany and Manufacturing industry. The results in Germany and Manufacturing industry are very similar and contrary to previous results. Cash flow-to-assets ratios are significantly higher in the fourth quartile than in the group zero or in the first quartile. These results are statistically significant at one percent level and do not depend on the time of ranking. Rankings from year t and t-1 provide similar results. On the whole my results provide support to my hypothesis but results within single country and industry show that these results may be industry country and industry dependent.

7.4. Excess cash and diversification

This section addresses the relation between excess cash and diversification. The fifth hypothesis claims that excess cash is negatively related to diversification. Because I have diversification data only from year 2000 I will first study how excess cash rankings from year 2000 explain diversification. In addition I will study how the rankings from previous years affect the degree of diversification in year 2000.

I measure diversification as the number of two-digit secondary SIC codes that are different from the primary SIC code. This measure of diversification is less sophisticated than for example the one used by Chen and Steiner (2000) which also takes account for the weight of assets in particular secondary business segment and how closely each segment is related to the primary business segment. Unfortunately I do not have sufficient data to use their measure.

The average number of secondary SIC codes in each ranking of excess cash is reported in Table 19. On the average firms in the second quartile (1.88) have the highest diversification level and firms in the third quartile (1.60) have the lowest level. I test the mean diversification degree of each quartile to the value of group zero and the first quartile. These tests reveal that the diversification degree in the third quartile is lower than in the group zero at a statistically low significance level of 10 percent. Because these results lack statistical significance I do not find support to my hypothesis although the values follow my expectations. Due to my previous finding that excess cash rankings fluctuate annually it may be naïve to assume that firms could alter their diversification levels every year on the basis of their cash balance. Therefore I expand my time horizon to cover the whole history of excess cash holdings.

Table 19: Diversification and excess cash rankings from year 2000
This table presents the degree of diversification in different quartiles of excess cash holdings. Number of additional SIC codes tells the average number of additional two-digit secondary SIC codes that are different from the two-digit primary SIC code. T-statistics are for tests of difference in means from quartile four to group zero.

Ranking	Number of additional SIC codes	T-statistics
Quartile 4	1.72	-0.67
Quartile 3	1.60	-1.72*
Quartile 2	1.88	0.42
Quartile 1	1.86	0.30
Group 0	1.82	

*Significant at 10 percent level

I test if the rankings from previous years would show a stronger relation between diversification level and excess cash holdings. I assume that the more persistently a firm holds excess cash the less diversified it is. I rank firms into six groups according to the number of years that they are ranked in the highest quartile of excess cash. Panel A in Table 20 shows the number of additional SIC codes for these six groups. On the whole the results are mixed and lack statistical significance. The only statistically significant observation (5 percent level) is that firms that remain in the fourth quartile for four years are significantly less diversified than firms that are not ranked in that quartile at all. This observation gives some support that a history of constant substantial excess cash would lead to a lower diversification level.

However the fact that firms that remain in the highest quartile for five years are as diversified as firms that are never ranked into the highest quartile raises doubts about these results. The results do suggest at least that firms that are ranked into the highest quartile for four years do not loose their excess cash because of diversifying acquisitions.

The results from the relation between persistence of positive excess cash and diversification level (not reported) provide also mixed results and the ones that are statistically significant are very similar to Table 19. It seems that firms that have positive excess cash for four or two years are significantly less diversified than firms that have negative excess cash for the whole sample period.

Table 20: Diversification and history of excess cash
Panel A presents the number of years a firm is ranked into the highest quartile of excess cash. Diversification measure is average number of secondary SIC codes. Panel B presents a change in excess cash rankings and the average number of secondary SIC codes for firms that experience that change. T-statistics are for tests of difference in means between values from 5 to 0 years in Panel A and from constant 4 to constant 0 in panel B.

Panel A: History of Q4 rankings			Panel B: Certain changes in rankings		
Number of years in Q4	Diversification measure	T-statistics	History of excess cash rankings	Diversification measure	T-statistics
5	2.03	0.72	Constant 4	2.03	0.46
4	1.34	-2.31**	Once from 4 to 0	1.40	-2.41**
3	1.47	-1.63	Once from 0 to 4	1.79	-0.55
2	1.57	-1.60	Constant 0	1.91	
1	1.72	-1.00			
0	1.85				

***, **, * Significant at the 1, 5, and 10 percent levels, respectively.

I try to find more support to my hypothesis by studying also changes in excess cash rankings. I assume that a firm needs excess cash in order to increase diversification and that this increase will result into decrease in excess cash. Therefore firms that have experienced a drastic decrease in excess cash holdings should be more diversified. Of course the diversification level in year 2000 can be a result of decisions that were made beyond my sample horizon. And it is not likely that a single acquisition could increase diversification level significantly, because most of these sample firms could have been already diversified. On the other hand firms that have experienced an increase in excess cash could be less diversified because the source of this cash can be sale of assets, which can reduce diversification level. This would support my hypotheses that managers want to reduce their risk either by diversifying or by holding excess cash.

The average number of additional Sic codes for firms that remain in the fourth quartile or in the group zero as well as for firms that move from quartile four to group zero or vice versa are presented in Table 20 Panel B. It shows that firms that are constantly in the fourth quartile (2.03) are more diversified than firms that have constantly negative excess cash (1.93). However this result is not statistically significant. It seems that firms that loose excess cash are less diversified (1.40) than firms that are constantly in the grouping of negative excess cash. This result is also statistically significant (5 percent level). The result is against to my argument that the loss of excess cash is a result of increase in diversification.

On the whole I find no support to my hypothesis of negative relation between excess cash and diversification. It can be that diversification is also industry and country related and that causes my mixed results. Firms that operate in some primary industries can find it harder to justify diversification than in other industries. It can be the case with different countries as well and this makes the interpretation of the results more difficult.

Table 21 reports the average diversification level by industry and country. I test if the results change when I compare the relation between excess cash and diversification in Germany and in Manufacturing industry. This does not seem to be the case. When I repeat the previous test of difference in means between different excess cash rankings in year 2000. I do not find any significant change in results. The higher quartiles of excess cash in year 2000 are less diversified but the results are without statistical significance in Germany and only moderately significant in Manufacturing industry.

Table 21: Average diversification levels by country and industry
This table presents the average number of secondary sic codes in each industry grouping and country.

Industry	Diversification measure	Country	Diversification measure
Chemical Products	1.47	Australia	1.96
Computer	1.16	Austria	1.88
Construction	2.51	Canada	1.20
Durable Goods	1.64	Denmark	1.47
Electric and Gas Service	1.32	Finland	1.58
Electronic Equipment	1.43	Germany	1.92
Entertainment Services	2.45	Japan	1.94
Food Products	1.68	Malaysia	3.30
Manufacturing	2.07	Netherlands	1.66
Metal Mining	0.67	Norway	1.18
Non-durable Goods	1.90	Singapore	2.55
Oil and Gas	1.00	Sweden	1.68
Paper and paper products	1.64	Switzerland	2.30
Retail	2.13	Thailand	0.98
Scientific Instruments	1.66	U.K.	1.56
Textile	1.47		
Transportation	1.99		
Others	1.74		

7.5. *Excess cash and asset utilization*

According to the sixth hypothesis excess cash should lead to poor assets utilization measured as sales-to-assets ratio. This is because excess cash can be used to organisational inefficiencies or other inefficient projects (Jensen, 1986). If excess cash is used to acquire fancy office buildings etc. it will increase assets base. And even if it is not used at all it will increase asset base as well because it will be included in short-term investments. Asset turnover defined as sales-to-assets ratio should provide a proxy for agency costs. Because I believe that excess cash itself is an agency cost and it further increases agency costs there should be a negative relation between excess cash and asset utilization ratio.

Results in Table 22 support this hypothesis. Asset utilization rate is significantly lower in the fourth quartile (0.99) than in the group zero (1.16) or in the first quartile (1.16). This finding is also statically very significant (0.1 percent level). However the sales-to-assets ratio does not seem to increase monotonically. Instead both the second (1.11) and third quartiles (1.10) have significantly higher ratios. I find that excess cash has a clear negative relation to asset utilization. However I cannot say that firms in the first quartile or group zero would not suffer from agency costs because I do not know what is the right benchmark.

Table 22: Asset utilization and excess cash rankings
The table presents average sales-to-assets ratio for all excess cash rankings. The T-statistics are for tests of difference in means from quartile four to group zero.

Excess cash ranking	Sales-to-assets	T-statistics
Quartile 4	0.99	-6,29***
Quartile 3	1,11	-1,56
Quartile 2	1,10	-2,21**
Quartile 1	1,16	0,22
Group 0	1,16	

***, **, * Significant at the 1, 5, and 10 percent levels, respectively.

A previous study by Singh and Davidson (2002) provides this benchmark because the average asset sizes in my sample and their sample are comparable (2.1 billion and 1.9 billion U.S. dollars). They find that the average sales-to-asset ratio in the U.S. in year 1994 is 1.40. The sales-to-assets ratios in my sample are much lower suggesting higher agency costs. This is not surprising because on the basis of my sample countries ownership structure and investor protection level U.S. has significantly lower expected agency costs. This leads to an interesting question of what are the agency costs by countries and industries measured as asset utilization and do these results coincide with the existence of excess cash.

There are great differences in average sales-to-assets ratio between different industries and countries as reported in Table 23. The three industries that have the highest ratios are Non-durable goods (2.05), Durable goods (1.60) and Retail (1.50). The three industries, which have the lowest ratios, are Metal mining (0.44), Entertainment (0.50) and, Electric and gas service (0.54). The fact that Electric and gas service and Oil and gas industries have sales-to-asset ratios that are significantly below one supports a link between excess cash and poor asset utilization. Both of these industries have a lot of firms ranked in the highest quartile of excess and these rankings are also persistent. Furthermore the oil industry is claimed to have a history of high agency costs.

When comparing the sales-to-assets ratios between different countries the differences are less dramatic. The three countries that have the highest ratios are Germany (1.39), Netherlands (1.55) and Switzerland (1.44). These are not the countries that were expected to have the lowest agency costs but they are neither among the highest expected ones. Although excess cash is very common in the Netherlands it does not seem to show in asset utilization. The three countries that have the lowest ratios are Malaysia (0.57), Singapore (0.73) and Thailand (0.78). These are exactly the three countries that were expected to suffer from the highest agency costs.

I try to study the robustness of results by comparing the results from the annual rankings of excess cash for Germany and Manufacturing industry. The results are remarkably similar to Table 22. Both in Germany and in Manufacturing industry the lowest asset utilisation is in the fourth quartile firms. These differences are also statistically significant at 0.1 percent level. Based on these results I claim that excess cash and asset utilization are negatively related.

Table 23: Average sales-to-assets ratios by industries and countries

Industry	Sales-to-assets ratio	Country	Sales-to-assets ratio
Chemical Products	0.94	Australia	0.97
Computer	1.42	Austria	1.04
Construction	1.20	Canada	0.84
Durable Goods	1.60	Denmark	1.10
Electric and Gas Service	0.54	Finland	1.29
Electronic Equipment	1.20	Germany	1.39
Entertainment Services	0.50	Japan	0.95
Food Products	1.22	Malaysia	0.57
Manufacturing	1.11	Netherlands	1.55
Metal Mining	0.44	Norway	0.86
Non-durable Goods	2.05	Singapore	0.73
Oil and Gas	0.61	Sweden	1.35
Paper and paper products	1.15	Switzerland	1.40
Retail	1.50	Thailand	0.78
Scientific Instruments	1.09	U.K.	1.38
Textile	1.35		
Transportation	0.95		
Others	1.06		

7.6. *Excess cash and the use of trade credit*

Hypotheses numbers seven and eight argue that excess cash affects the use of trade credit. The more excess cash a firm has the more trade credit will it offer to its customers and the less trade credit will it take from its suppliers. I measure financing offered to customers as the ratio of trade debtors to total sales and the financing received from the suppliers as the ratio of trade creditors to total sales.

The average values of these ratios for each excess cash grouping during the whole sample period are reported in Table 24. The results show that in contrary to my expectations firms in the highest quartile of excess cash do not offer more credit to their customers than the cash constrained firms. Actually firms in the fourth quartile have the lowest debtors-to-sales ratio and firms in the group zero have the highest ratio. The test of difference in means between

these two groups shows that the difference is statistically significant at 1 percent level. The results are similar when the fourth and the first quartile are compared (significant at 5 percent level). Previous studies (e.g. Petersen and Rajan (1997)) show that firms that are doing poorly have to offer more credit to their customers. I assume that negative excess cash is a result of unsatisfactory performance and therefore these firms offer more credit to increase performance.

The results from the relation between trade creditors and excess cash are mixed as reported in Table 24. It shows that the quartiles of positive excess cash have lower creditors-to-sales ratio than the group of negative excess cash. However the differences are statistically significant for only quartiles three (5 percent level) and two (10 percent level). Contrary to my expectations the fourth quartile has the highest ratio (0.12) from the positive excess cash quartiles and it is therefore not significantly different from the group zero or from the first quartile. It is very interesting to find that firms that need least external financing use it almost as much as firms that need it most.

Table 24: Average debtors-to-sales and creditors-to-sales ratio by each excess cash rankings
This table shows the average debtors- and creditors-to-sales ratio for each excess cash ranking. Trade debtors include trade receivables within one year and after one year as specified by the company relating to its normal business activities (shown net of provisions for bad and doubtful debt). Trade creditors include trade payables within one year and after one year as specified by the company relating to its normal business activities (bills payable not included). The T-statistics are for the tests of difference in means from quartile four to group zero.

Ranking	Debtors-to-sales	T-statistics	Creditors-to- sales	T-statistics
Quartile 4	0.160	-3.17***	0.117	-0.77
Quartile 3	0.173	-2.15**	0.099	-2.08**
Quartile 2	0.170	-2.38**	0.106	-1.72*
Quartile1	0.186	-0.97	0.117	-1.21
Group 0	0.197		0.141	

***, **, * Significant at the 1, 5, and 10 percent levels, respectively.

The results so far do not support my hypothesis of positive relation between excess cash and trade debtors. Also the support to negative relation between excess cash and trade creditors is very weak. It can be that excess cash rankings should be from the previous year because firms may not be able to change their policies in the year when they become excess cash holders. Therefore I repeat the previous tests by using excess cash rankings from previous year. The results however do not change significantly (results not reported). I expect that maybe changes in excess cash rankings capture better financing behaviour than current or historical rankings. I try to find out the relation between the changes in the use of trade financing and the changes in excess cash holdings by studying the ratios after a change.

Table 25 shows the ratios of debtors-to-sales and creditors-to-sales after a certain change in excess cash rankings. For example if a firm has stayed in the fourth quartile its debtors-to-sales ratio is on average 0.152 and the same ratio for a firm that has stayed in the group zero is 0.197. The firms that have held their position in the highest ranking have significantly lower debtors-to-sales ratio (1 percent level) than the firms that have stayed in the lowest ranking. This suggests that firms that remain in the highest quartile do not attempt to increase sales by increasing financing to their customers. Otherwise the results concerning debtors-to-sales have little statistical significance. It is especially interesting to find that firms that have lost their position in the highest quartile and ended up in the lowest quartile do not seem to increase financing to their customers significantly. This suggests that it may take longer than a year before firms start altering their policies concerning trade financing.

The results on changes in ranking and following creditors-to-sales ratio support more my hypothesis. Firms that remain in the highest quartile of excess cash have statistically significantly lower creditors-to-sales ratios than firms that are remain in the grouping of negative excess cash (5 percent level). Firms that experience the most dramatic decrease (from quartile four to group zero) in excess cash ranking have more trade credit (0.12) than firms that remain or gain position in the highest quartile (0.09-0.11) but less than firms that were already in the lowest group of cash holdings (0.15). This suggests that firms adjust their use of credit according to their cash levels.

Table 25: Changes in excess cash rankings and debtors- and creditors-to sales ratios after the change
The table presents average debtors- and creditors-to-sales ratio in year t for selected changes in excess cash rankings between year t and t+1. T-statistics are for tests of difference in means from 4-4 to 0-0.

Change in ranking	Debtors-to-sales	T-statistics	Creditors-to-sales	T-statistics
4-4	0.152	-3.28***	0.090	-2.00**
3-4	0.166	-1.91*	0.093	-1.82*
2-4	0.181	-0.47	0.106	-1.22
1-4	0.203	0.17	0.098	-1.49
0-4	0.177	-0.66	0.109	-1.19
4-0	0.157	-1.44	0.121	-0.75
0-0	0.197		0.150	1.36

***, **, * Significant at the 1, 5, and 10 percent levels, respectively.

Comparison between Tables 24 and 25 shows that firms that gain position in the fourth quartile have higher debtors-to-sales ratio and lower creditors-to-sales ratio than all firms that are ranked into the fourth quartile. This supports my argument that firms do not adjust their

use of trade financing policies immediately after a change in their cash holdings. I also study the proportional change in these ratios after changes in excess cash rankings. These results are mixed and have no statistical significance (results not reported).

I test the robustness of my results by studying these ratios within one country and one industry. Once again I use Germany and Manufacturing industry as sub samples. The results show that country specific findings are mixed with the previous findings and that they are statistically insignificant. Debtors-to-sales ratio is slightly lower in the highest quartile than in other groupings. However this difference is not statistically significant. In the creditors-to-sales ratio the fourth quartile and the group zero have almost equal values. The results in manufacturing industry are much more consistent with the previous results on the whole sample. The debtors-to-sales ratio is lower in the fourth quartile than in the group zero and this difference is statistically significant at five percent level. The creditors-to-sales ratios follow the same pattern and now the difference between the fourth quartile and the group zero is statistically significant at 1 percent level.

On the basis of these results I do not find support that excess cash increases the offered trade credit. However there is moderate support to the claim that it reduces the taken trade credit.

8. Conclusions and suggestions for future research

8.1. Summary of results

This thesis examines the existence of excess cash in international scope and its effects on sales growth, operating performance, diversification, asset utilization and the use of trade credit. The international sample contains 1096 firms with annual observations between years 1996-2000. The countries included are Australia, Austria, Canada, Denmark, Finland, Germany, Japan, Malaysia, Netherlands, Norway, Singapore, Sweden, Switzerland, Thailand and U.K.

The thesis is based on the agency costs that arise from the separation of management and ownership (Jensen and Meckling, 1976) and the agency costs of free cash flow (Jensen, 1986). The agency theory argues that managers try to maximize their own utility even at shareholders' expense. And the free cash flow hypothesis argues that managers' own utility tends to increase if they use free cash flow even in negative net present value projects instead of distributing it back to shareholders, which would maximise shareholder's utility. Previous studies indicate that excess cash increases acquisitions and these acquisitions are generally value decreasing (Harford, 1999). These studies also indicate that excess cash holdings are mainly temporary and the main reason for the loss of excess cash is negative operating cash flows suggesting decreased performance after excess cash build-up (Opler et al., 1999).

This thesis contributes to the existing literature by presenting international evidence from excess cash and by expanding the scope of the effects of excess cash on asset utilization, sales growth and the use of trade credit. The identification of excess cash holding firms relies heavily on Opler et al. (1999) in terms of the regression equation used to model "normal" cash levels.

The regression model is used to find out suggested cash-to-assets ratio for each firm in each year. By comparing these ratios to actual ratios excess cash holding firms can be identified. The regression equation coefficients reveal that cash-to-assets ratio is positively related to market-to-book ratio, cash flow-to-assets ratio, capital expenditure-to-assets ratio, industry cash flow volatility and financial distress costs and it is negatively related to asset size, net working capital-to-assets ratio, leverage and dividend payments. These findings are very

similar to Opler et al. (1999) and indicate that the regression model works also with my sample.

My results from the existence of excess cash show that it is most common in the Netherlands, Canada and Malaysia. Against to my hypothesis all these countries are not among the ones that have the highest expected agency costs. Results from the persistence of excess cash indicate that it is a transitory situation. This is because only three percents of all firms are ranked in the highest quartile of excess cash for the whole sample period. The persistence and existence of excess cash do not seem to be significantly related. Because the countries and industries where excess cash is most common are not necessarily the same where it is most persistent. These findings suggest that expected agency costs do not coincide with excess cash observations.

Although the highest quartile rankings of excess cash are not very persistent I find that the changes in excess cash rankings are quite moderate. Most firms that loose (gain) position in the highest quartile will be (were) ranked in the second highest quartile of excess cash in the next (previous) year. On the contrary to expectations the reason for the loss of excess cash does not seem to be negative operating cash flows as in Opler et al. (1999) but increases in capital expenditure.

High capital expenditure should result into sales growth. However I do not find that the probability of sales growth would be positively related to excess cash. In case that sales grow the growth in year t+1 is the most rapid in firms that were ranked in the highest quartile of excess cash in year t. The findings show no support to the claim that sales growth in excess cash holding firms should increase the probability of decreasing operating performance. The results from current and future operating performance generally indicate that excess cash is negatively related to operating performance.

The results from diversification (defined as the number of two-digit SIC codes that differ from the primary SIC code) and excess cash are mixed and generally insignificant. However the results indicate that firms, which have experienced the most drastic decrease in excess cash (from the highest quartile to negative excess cash) are less diversified than firms that have constantly negative or the highest amount of excess cash.

Results from asset utilization show that excess cash is negatively related to sales-to-assets ratio. This result provides a link between excess cash and agency costs because asset utilization ratio has been widely used in the literature as a proxy for agency costs. Furthermore I find that the lowest asset utilization ratios are in the three countries (Malaysia, Singapore and Thailand) that were defined to have the highest expected agency costs.

Results concerning the use of trade credit do not indicate any support to my hypothesis that excess cash would increase the offered trade credit and moderate support to the hypothesis that it would reduce the taken trade credit. Trade debtors-to-sales ratio in year t+1 is significantly lower for firms that were ranked in the highest quartile of excess cash in year t than for firms that were ranked in the first quartile or the group of negative excess cash. Suggesting that excess cash holding firms do not attempt to increase sales by offering credit to their customers. Trade creditors-to-sales ratio shows mixed results because the highest group of excess cash has similar creditors-to-sales ratio than the group of negative excess cash. However the second and third highest quartiles have significantly lower ratios. Suggesting that firms that need least credit use it as much as the firms that need most credit. I find moderate support to the hypothesis because firms that hold their position in the highest quartile have significantly lower creditors-to-sales ratio than firms that hold their position in the group of negative excess cash.

The main research problem of this thesis is the connection between agency costs and excess cash. On the basis of the results from individual hypotheses I find that excess cash is positively related to agency costs. The results from asset utilization provide the strongest support to this argument. Also the increase in capital expenditure for firms that loose excess cash and the results from operating performance support this relation between excess cash and agency costs. However I find that differences in expected agency costs do not explain the commonness and persistence of excess cash.

The robustness of the whole sample results can be affected by differences in country and industry sub samples although my regression model should account for these differences. By studying separately Germany and Manufacturing industry I find results that are mixed or insignificant with the whole sample results in operating performance and in the use of trade credit (only German sample). In the remaining parts the sub samples provide similar results as the whole sample.

8.2. Suggestions for future research

This study includes only large and quite old firms and may therefore exclude some excess cash holders or firms where the agency costs of separation of ownership and management are the highest. An interesting group of firms for future research would be high technology firms that were listed during the hot markets in the late 1990's. Many of these firms significantly overestimated their growth opportunities and were therefore able to raise more money than would have been needed for their future positive net present value projects. As the share prices later crashed these firms experienced a decrease in market-to-book ratio and therefore became excess cash holders. At the same time the separation of ownership and management significantly increased because during initial public offerings founder managers usually sell some of their own shares in addition to new issued shares. It would be interesting to see how this decrease in investment opportunities and substantial excess cash holdings affected the behaviour of these firms.

References

Anderson, R., C., Bates, T., W., Bizjak, J., M., Lemmon, M., L., 2000. Corporate governance and firm diversification. Financial Management, Spring 2000, 5-22.

Biais, B., Gollier, C., 1997. Trade credit and credit rationing. The Review of Financial Studies, 10, 4, 903-937.

Blancard, O., Lopez-de-Silanes, F., Shleifer, A., 1994. What do firms do with cash windfalls? Journal of Financial Economics, 36, 337-360.

Brealey, R., A., Myers, S.,C., 1996. Principles of Corporate Finance, McGraw-Hill, New York.

Brookfield, D., Ormrod, P., 2000. Executive stock options: volatility, managerial decisions and agency costs. Journal of Multinational Financial Management, 10, 275-295.

Brush, T., H., Bromiley, P., Hendrickx, M., 2000. The free cash flow hypothesis for sales growth and firm performance. Strategic Management Journal, 21, 455-472.

Byrd, J.W., Hickman, K.A., 1992. Do outside directors monitor managers? Journal of Financial Economics, 32, 195-221.

Byrd, J., Parrino, R., Pritsch, G., 1998. Stockholder-manager conflicts and firm value. Financial Analyst Journal, May/June, 14-30.

Chen, C.R., Steiner, T.L., 2000. An agency analysis of firm diversification: the consequences of discretionary cash and managerial risk considerations. Review of Quantitative Finance and Accounting 14, 247-260.

Chung, K.,M., Jo, H., 1996. The impact of security analysts' monitoring and marketing functions on the market value of firms. Journal of Financial and Quantitative Analysis, 31, December , 493-512.

Dann, Y., L., DeAangelo, H., 1988, Corporate financial policy and corporate control, a study of defensive adjustments in asset and ownership structure. Journal of Financial Economics, 20, 87-127.

Dechow, P., M., Sloan, R., G., 1991. Executive incentives and the horizon problem. Journal of Accounting and Economics, 14, 51-89.

Denis, J., Denis, D., Sarin, A., 1997 a. Agency problems, equity diversification and corporate diversification. The Journal of Finance, LII, 1, 135-159.

Denis, J., Denis, D., Sarin, A., 1997 b. Ownership structure and top executive turnover. Journal of Financial Economics, 45, 193-221.

Doukas, J., A., Kim, C., Pantzalis, C., 2000. Security analysis, agency costs, and company characteristics. Financial Analysts Journal, November/December, 54-63.

Easterbrook, F.F., 1984. Two agency-cost explanations of dividends. The American Economic Review, 74, 650-659.

Faleye, O.,2001. Cash and corporate control. www.ssrn.com

Fama, E., F., 1980. Agency problems and the theory of the firm. The Journal of Political Economy, 88, 288-307.

Fama, E., F., 1983. The separation of ownership and control. Journal of Law and Economics, 26, 301-325.

Gertner, R., H., Scharfstein, 1994. Internal versus external capital markets. The Quarterly Journal of Economics, November, 1211-1230.

Guay, W., Harford, J., 2000. The cash-flow permanence and information content of dividend increases versus repurchases. Journal of Financial Economics, 57, 385-415.

Guedes, J., Opler, T., 1996. The determinants of the maturity of corporate debt issues. The Journal of Finance, 51,1809-1833.

Gul, F., A., 2001. Free cash flow, debt monitoring and managers' LIFO/FIFO policy choice. Journal of Corporate Finance, 7, 475-492.

Harford, J., 1999. Corporate cash reserves and acquisitions. The Journal of Finance, LIV, 1969-1997.

Harvey, C.,R., Lins, K., V., Roper, A., H., 2001. The effect of capital structure when expected agency costs are extreme. NBER Working Paper Series 8452.

Jensen, M.C., 1986. Agency costs of free cash flow, corporate finance and takeovers. American Economic Review, 76, 323-329.

Jagannathan, M., Stephens, C., P., Weisbach, M., S., 2000. Financial flexibility and the choice between dividends and stock repurchases. Journal of Financial Economics, 57, 355-384.

Jensen, M., C., Meckling, W., H., 1976. Theory of the firm: Managerial Behavior, agency costs and ownership structure. Journal of Financial Economics, 3, 305-360.

Johnson, W., B., Magee, R., Nagarajan, N., Newman, H., 1985. An analysis of the stock price reaction to sudden executive deaths: Implications for the managerial labor market, Journal of Accounting & Economics 24, 217-254.

Kaplan, S., N., 1989. The effects of management buyouts on operating performance and value, Journal of Financial Economics, 28, 217-254.

La Porta, R., Lopez-De-Silanes, F., Schleifer, A., 1999. Corporate ownership around the world. The Journal of Finance, LIV, 2, 471-517.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R., W., 1998. Law and Finance. Journal of Political Economy, 106, 1113-1155.

Lamont, O., 1997. Cash flow and investment: Evidence from internal capital markets. The Journal of Finance, LII, 1, 83-109.

Lang, L., Poulsen, A., Stulz, R., 1995. Asset sales firm performance and agency costs of managerial discretion. Journal of financial economics, 37, 3-37.

Lie, E., 2000. Excess funds and agency problems: an empirical study of incremental cash disbursements. The Review of Financial Studies, 13, 219-248.

Maloney, M., T., McCormick, R., E., Mitchell, M., L., 1993. Managerial decision making and capital structure. Journal of Business, 66, 189-216.

May, D.O., 1995. Do managerial motives influence risk reduction strategies. The Journal of Finance, L, 4, 1291-1308.

Miller, M., Orr, D., 1968. The demand for money by firms: Extensions and analytical results. The Journal of Finance, 23, 735-759.

Murphy, K., J., 1999. Executive compensation. Handbook of Labor Economics, vol 3. North Holland.

Myers, S., C., Rajan, R., G., 1995. The paradox of liquidity. NBER Working Paper Series, 5143.

Nohel, T., Tarhan,V., 1998. Share repurchases and firm performance: New evidence on the agency costs of free cash flow. Journal of Financial Economics, 49, 187-222.

Opler, T., Pinkowitz, L., Stulz, R., Williamson, R., 1999. The determinants and implications of corporate cash holdings. Journal of Financial Economics, 52, 3-46.

Petersen, M., A., Rajan, R.G., 1997. Trade credit: Theories and evidence. The Review of Financial Studies, 10, 3, 661-691.

Shin, H., Kim, Y., H., 2002. Agency costs and efficiency of business capital investment: evidence from quarterly capital expenditures. Journal of Corporate Finance, 8, 139-158.

Shleifer, A., Vishny, R., W., 1997. A survey of corporate governance. The journal of Finance, LII, 737-783.

Shyam-Sunder, L., Myers, S.C., 1999. Testing static tradeoff against pecking order models of capital structure. Journal of Financial Economics, 51, 219-244.

Singh, M., Davidson, W., N., 2002. Agency costs, ownership structure and corporate governance mechanisms. Journal of Banking and Finance, Forthcoming.

Stulz, R., M., 1988. Managerial control of voting rights: financing policies and the market for corporate control. Journal of Financial Economics, 9, 139-183.

Teoh, S.,H, Welch, I., Whong, T.J., 1998. Earnings management and the underperformance of seasoned equity offerings. Journal of Financial Economics, 50, 63-99.

Tufano, P., 1998. Agency costs of corporate risk management. Financial Management, 27, 1, 67-77.

Appendix 1:
This table reports the two-digit SIC-codes included in each industry group.

Industry	Two-Digit SIC Codes
Chemical Products	28
Computer	73
Construction	15-17
Durable Goods	50
Electric and Gas Service	49
Electronic Equipment	36
Entertainment Services	70, 78, 79
Food Products	20
Manufacturing	30-35
Metal Mining	10
Non-durable Goods	51
Oil and Gas	13
Paper and paper products	24-27
Retail	53, 54, 56, 57, 59
Scientific Instruments	83
Textile	22, 23
Transportation	37, 39-42, 44, 45
Others	Remaining (excluding 60-69)

Appendix 2:

This table illustrates correlations between regression key variables.

	CASH	MTB	SIZE	CF	NWC	CAPEX	LEVERAGE	INDSIG	FINDIS	DIVDUM
CASH	1.00									
MTB	0.03	1.00								
SIZE	0.05	-0.01	1.00							
CF	0.17	0.22	-0.02	1.00						
NWC	-0.08	0.02	-0.17	0.11	1.00					
CAPEX	-0.05	0.15	-0.03	0.37	-0.13	1.00				
LEVERAGE	-0.24	-0.07	0.13	-0.18	-0.35	-0.02	1.00			
INDSIG	0.11	0.01	-0.07	-0.14	-0.01	-0.01	-0.07	1.00		
FINDIS	0.05	0.12	0.02	0.02	0.09	-0.05	-0.02	0.06	1.00	
DIVDUM	0.09	-0.05	0.21	0.22	0.06	0.00	-0.14	-0.13	-0.03	1.00